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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

(Supplement 131)

AUGUST 1974

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 131)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in July 1974 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*



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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 266 reports, articles and other documents announced during July 1974 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes—subject and personal author—are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1974 Supplements.

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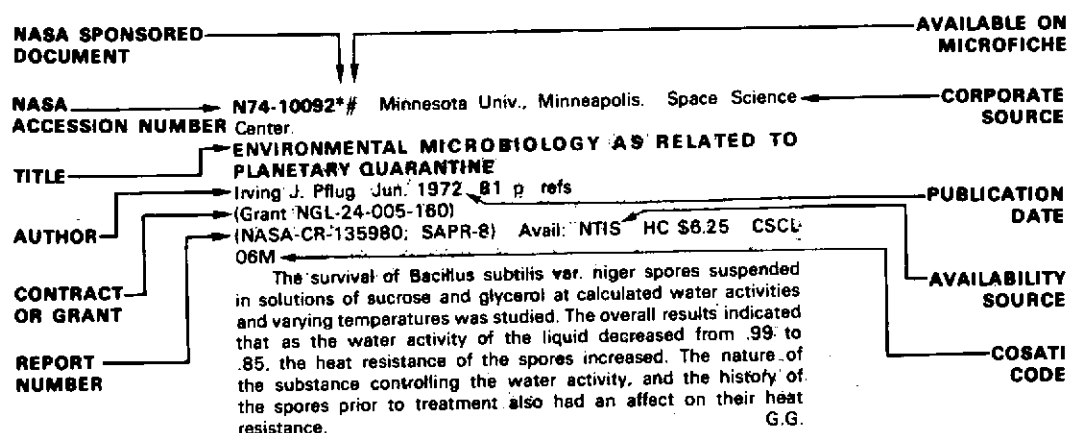
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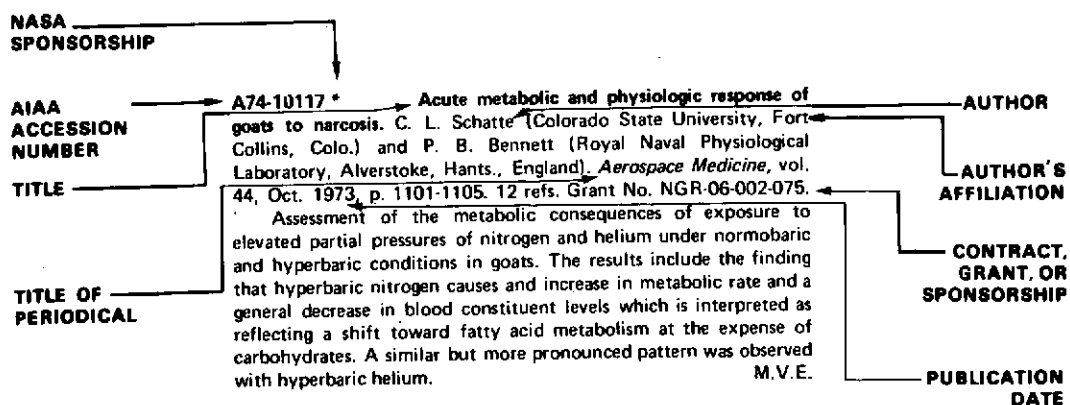
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TYPICAL CITATION AND ABSTRACT FROM IAA





AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 131)

AUGUST 1974

IAA ENTRIES

A74-28544 # Interaction of responses in the posterior part of the claustrum (O vzaimodeistvii otvetov zadnei chasti ogrady). N. A. Zhgenti and A. S. Timchenko (Akademiia Nauk Gruzinskoi SSR, Institut Fiziologii, Tiflis, Georgian SSR). *Akademiia Nauk Gruzinskoi SSR, Soobshcheniia*, vol. 73, Feb. 1974, p. 453-455. 9 refs. In Russian.

Investigation of the interaction of evoked responses to light flashes, sound clicks, and skin stimulation in the posterior portion of the claustrum of chloralosed cats. The results obtained suggest that the integration of light and sound impulses with other impulses takes place in the posterior part of the claustrum. M.V.E.

A74-28563 # For those who fly - The Aeromedical Consultation Service. W. H. King and M. C. Lancaster (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Air University Review*, vol. 25, Mar.-Apr. 1974, p. 10-18.

The Aeromedical Consultation Service of the USAF School of Aerospace Medicine at Brooks AFB provides services involving (1) evaluation of difficult, borderline, or obscure medical problems in flying personnel, (2) evaluation of the medical fitness of flyers assigned to special operations, and (3) support and assistance to unit flight surgeons, command surgeons, the Surgeon General, and the chief medical officers of the Air Force Reserve and the Air National Guard. The present work contains a detailed description of the facilities and techniques employed by this service when processing patients, beginning from initial preparations prior to reporting and proceeding through general examination, special testing, and recommendation based on results obtained. Particular procedures examined include diet and weight control consultation, evaluation of cardiac status, EEG recording, flight simulation testing, and examination of particular organs. T.M.

A74-28564 # The man-machine interface. N. P. Clarke (USAF, Aerospace Medical Div., Brooks AFB, Tex.). *Air University Review*, vol. 25, Mar.-Apr. 1974, p. 19-27.

Description of human engineering functions performed by the Aerospace Medical Division of Air Force Systems Command as pertaining to the development of methods for optimizing man's performance at the man/machine interface by providing engineering design criteria and defining man/machine geometry considerations. Attention is given to the kinds of work done in biotechnology to

support the development and operation of such aerospace systems as fighters, bombers, missiles, airlift vehicles, reconnaissance and surveillance equipment, and command and communications facilities. The four major technical areas of the biotechnology program considered include operational atmospheres, radiation, mechanical force, and human performance. T.M.

A74-28565 # Visually coupled systems. J. A. Birt (USAF, Aerospace Medical Div., Brooks AFB, Tex.) and T. A. Furness, III (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio). *Air University Review*, vol. 25, Mar.-Apr. 1974, p. 28-40. 20 refs.

Description of research and development efforts aimed at integrating the natural visual and motor skills of an operator with a weapons system or other type of machinery subject to his control. In the systems discussed, an operator visually searches for and tracks an object of interest. His line of sight is measured and used to aim sensors and/or weapons toward the object. Information related to his visual/motor task from sensors, weapons, or central data sources is fed directly back to his vision by special displays so as to enhance his task performance. This corresponds to a unique control/display subsystem in which man's line of sight is measured and used for control, while visual information is fed back directly to the eyes for his attention and use. Principles of operation, general design features, and performance aspects are described for interim and advanced helmet-mounted sighting systems. T.M.

A74-28649 Spatial hearing (Räumliches Hören). J. Blauert (Rheinisch-Westfälische Technische Hochschule, Aachen; Ruhr-Universität, Bochum, West Germany). Stuttgart, S. Hirzel Verlag, 1974. 262 p. 612 refs. \$19.35. In German.

The relationship between the auditory event and the environment in which the event takes place is examined. The concept of 'spatial hearing' takes into account relations between the location of the auditory event and the other parameters. The system to be investigated is discussed together with questions regarding the investigative technique, psychometric methods, signals and sound fields, and probe microphones. Questions of spatial hearing in the case of one sound source are explored, giving attention to the sound field at both ears, aspects of sound propagation within the ear, the evaluation of identical and nonidentical signals in the ear, interaural time and intensity differences, and the theories concerning the operational principles of hearing. Aspects of spatial hearing in the case of several sound sources are also investigated. G.R.

A74-28816 # Change in the capillary blood circulation of the brain during hypoxia /in vivo observation/ (Izmenenie kapillarnogo krovoobrashcheniia mozga pri gipoksii /prizhiznennyye nabludeniia/). M. K. Kalinina, Iu. I. Levkovich, and K. P. Ivanov (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 215, Mar. 1, 1974, p. 226-229. 16 refs. In Russian.

The finest capillaries (down to a diameter of 4 microns) of the cerebral cortex were observed and photographed under 400 magnification up to a depth of 40-50 microns from the surface of the living brain of 21 test animals. The optical system, which employed

reflected polarized light, is described and schematically illustrated. Successive pictures were statistically analyzed in order to detect the changes in the diameter of the capillaries during local hypoxia. The main question being investigated was the behavior of certain so-called 'plasma' capillaries, containing no erythrocyte and supposedly carrying only blood plasma, which may act as reserve vessels during hypoxia since they have been observed to expand in tests using dead brain preparations. No such special 'plasma' capillaries were detected in the present experiment, nor were any other reserve capillaries found. It was found on the average that the capillaries expanded by 30% during hypoxia. P.T.H.

**A74-28837 # Potentials evoked by mental conception of a change in intensity of photic stimuli (Vyzvannye potentsialy pri myslennom predstavlenii izmeneniia intensivnosti svetovykh stimulo-
v).** L. M. Puchinskaia (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 24, Jan.-Feb. 1974, p. 18-24. 13 refs. In Russian.

The question experimentally investigated was whether a mental conception of a stimulus not actually present can be more decisive than an actual stimulus in the determination of the nature of an evoked potential. The subjects were six females and five males, and the stimuli were series of light flashes of varying intensities. Autosuggestion of the stimuli was induced by repeating the various series with small changes in the order of the different flash intensities. The sum evoked potentials of both the occipital and central cortical areas were recorded. A statistically significant ($P = 0.05$) change of the amplitudes of the SEP late components was found. P.T.H.

A74-28838 # Conditioned time reflex in different stages of natural night sleep in man (Uslovnyi refleks na vremia v razlichnye stadii estestvennogo nochnogo sna u cheloveka). V. M. Vasil'eva and M. V. Slavutskaia (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 24, Jan.-Feb. 1974, p. 116-123. 29 refs. In Russian.

A conditioned time reflex was developed in thirteen subjects by rhythmic acoustic stimulation in all phases of their sleep, and the electrophysiological correlates of the reflex are analyzed. The dynamics of these reactions is determined by their specificity, the length of the interval between the stimuli, and the phase of sleep. A weak cutaneous galvanic reaction along with a large number of nonspecific EEG reactions demonstrate the high level of activity of the cortex in conjunction with a decrease in the activity of the subcortical structures. During slow-wave sleep, the reactions preceding the stimulus appear earlier than during paradoxical sleep; it is likely that this phenomenon is connected with the activity of the subcortical time-count mechanisms. Thus, slow-wave sleep can be characterized by a decrease in cortical activity compared to that of the subcortical structures. P.T.H.

A74-28839 # A model of the influence of rhythmical potential oscillations on the conduction of a stimulus (O modeli vliianiia ritmicheskikh kolebani potentsiala na provedenie vzbuzhdeniia). V. Iu. Krylov, T. V. Ostriakova, and G. I. Shul'gina (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 24, Jan.-Feb. 1974, p. 124-131. 34 refs. In Russian.

The model is presented in the form of a program for a multipurpose computer. It is based on experimental measurements of the transmission of stimuli along a neuronal network and on correlations of the efficiency of transmission with parameters of the rhythmical potential oscillations of the neuronal membranes. Experiments on the model show that in the presence of rhythm enhancement of the conduction of a stimulus will be observed if the excitation encounters at the points of phase reversal a phase of enhanced excitability. In the absence of the appropriate ratio of frequency and phase of the oscillations in successively connected groups of neurons, and especially when the coherence of the

oscillations is destroyed, a decrease in the conduction will be observed. The results obtained on the model can be used for the evaluation of measurements of bioelectrical activity in the development of conditioned reflexes and internal inhibition. P.T.H.

A74-28840 # Formal mathematical methods for the investigation of the relations between the electric activity of the brain and psychic phenomena (Formal'no-matematicheskie metody izucheniia sootnosheniia elektricheskoi aktivnosti mozga i psikhicheskikh fenomenov). K. K. Monakhov, G. L. Epshtein, A. I. Nikiforov, and V. K. Bochkarev (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 24, Jan.-Feb. 1974, p. 202-208. 11 refs. In Russian.

A74-28895 Hydrodynamic modeling of the inner ear. L. A. Soroka (Akademiia Nauk SSSR, Akusticheskii Institut, Moscow, USSR). *(Akusticheskii Zhurnal)*, vol. 19, Nov.-Dec. 1973, p. 885-890. *Soviet Physics - Acoustics*, vol. 19, May-June 1974, p. 565-568. 8 refs. Translation.

The results of a theoretical and experimental investigation of a hydrodynamic cochlear model are discussed. The selection of similarity criteria for such models is examined, and the influence of viscosity of the cochlea is assessed. V.P.

A74-29027 # Investigations on the influence of hypokinesia of long duration and of exertion on the function and morphology of the myocardium. S. Baranski, W. Baranska, and M. Kujawa (Akademia Medyczna, Warsaw, Poland). *International Astronautical Federation, International Astronautical Congress, 24th, Baku, Azerbaidzhan SSR, Oct. 7-13, 1973, Paper*, 10 p. 11 refs.

In male rats subjected to hypokinesia of long duration (6 to 7 months) no major deviations from normal were observed either in the bioelectric activity of the heart or in the morphological picture. Only a lowered glycogen content and vacuolization of some few mitochondria were noted. Physical exertion causes, in animals kept for a long time in conditions of hypokinesia, pronounced morphological changes in the myocardium consisting in degeneration of the mitochondrial apparatus characteristic for states of myocardial hypoxia. These observations were confirmed by bioelectric investigation of the heart activity in which a lowering of the ST-T segment was found, this also pointing to hypoxia in the heart muscle. F.R.L.

A74-29032 # The simulation of human reactions under near vacuum conditions - Reactions to deep anoxia. L. Cettl, J. Dvorak (Central Institute of Railway Medicine, Prague, Czechoslovakia), and I. Dvorak (Ceskoslovenska Akademie Ved, Fysiologicky Ustav, Prague, Czechoslovakia). *International Astronautical Federation, International Astronautical Congress, 24th, Baku, Azerbaidzhan SSR, Oct. 7-13, 1973, Paper*, 4 p.

An investigation is conducted of factors related to the possibility of the rescue of astronauts in an emergency due to the loss of the hermetic seal of the spacecraft. The investigation consisted of tests with animals and studies with healthy young volunteers. On the basis of the results of the investigation it is recommended that measures should be taken to prevent the escape of oxygen from the respiratory system or other parts of the body. Ventilation should, therefore, be stopped and maximum pressure in the lung should be maintained. Harmful carbon dioxide effects should be eliminated. G.R.

A74-29101 The usefulness of human factors engineering (Nutzen der Anthropotechnik). R. Beyer (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugführung, Braunschweig, West Germany). *DFVLR-Nachrichten*, Apr. 1974, p. 529-531. In German.

The definition of human factors engineering is considered along with its objectives in obtaining man-machine systems of optimum characteristics. The principles of human factors engineering form an integral part of the elements which have to be taken into account in studies of the most suitable approaches for controlling an aircraft. Appropriate designs for display and control devices can be obtained

on the basis of simulation studies in which the computer supplies the data which will be provided later by the device under consideration.

G.R.

A74-29107 From the Institute of Aerospace Medicine in Bonn-Bad Godesberg - Electroencephalogram studies under acceleration loads on the centrifuge (Aus dem Institut für Flugmedizin in Bonn-Bad Godesberg - Elektroencephalogramm-Untersuchungen unter Beschleunigungsbelastung auf der Zentrifuge). H. Hohlweck (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugmedizin, Bad Godesberg, West Germany). *DFVLR-Nachrichten*, Apr. 1974, p. 549, 550. In German.

The effect of the time of day on the acceleration tolerance of ten male subjects was investigated in preliminary and main tests. It was found that certain changes in the EEG were always observed in the case of the same subjects. It is pointed out that these features were not in any way related to the time of day. The results of the investigation are compared with the findings obtained by other investigators in studies conducted at altitudes of up to 38,000 ft.

G.R.

A74-29115 # Mathematical model of receptive relaxation (Matematichna model' retseptivnoi relaksatsii). V. M. Il'in, L. V. Reshod'ko, and P. G. Bogach (Kiivskii Derzhavnyi Universitet, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 20, Mar.-Apr. 1974, p. 169-175. 6 refs. In Ukrainian.

Mathematical description of both the receptive relaxation phenomenon, first described by Cannon and Lieb (1971), and an analog model of this phenomenon obtained with the aid of an analog computer. Obtained models are also presented for such situations as: the feeding of food close in consistency either to bread in pieces, or to semolina gruel, or to buckwheat gruel, particularly, for the case of high mechanical excitation of the receptive fields. The model-mediated curves of stomach cavity pressure variations during food intake coincide with similar experimental curves.

M.V.E.

A74-29116 # Spectrophotometric determination of the concentration of neurosecretory substances in the posterior lobe of hypophysis under the action of acute hypoxia (Spektrofotometrične viznachennia konsentratsii neurosekretornoj rehovini v zadnii chasttsi gipofiza pri vplivi gostroi gipoksii). I. I. Gerzanich (Akademii Nauk Ukrain'skoi RSR, Institut Fiziologii, Kiev, Ukrainian SSR) and L. P. Lisiuk (Akademii Nauk Ukrain'skoi RSR, Institut Problem Onkologii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 20, Mar.-Apr. 1974, p. 192-197. 6 refs. In Ukrainian.

A74-29117 # Functional possibilities of the sympatho-adrenal system in healthy man (Funktional'ni mozhlivosti simpato-adrenalovoi sistemi zdorovikh liudei). I. A. Kogan (Kharkivskii Institut Medichnoi Radiologii, Kharkov, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 20, Mar.-Apr. 1974, p. 204-209. 20 refs. In Ukrainian.

Functional potentialities of the sympatho-adrenal system were investigated in healthy subjects as a function of age and sex by means of functional tests with administration of ACTH and small doses of insulin. No significant variations with age and sex were found.

A74-29118 # Influence of the functional state of the central nervous system on the metabolism and inter-organ distribution of copper (Vpliv funkcional'nogo stanu tsentral'noi nervovoi sistemi na obmin i mizhorganii, pozpodiil midi). R. D. Gabovich, I. A. Mikhaliuk, and L. D. Fesenko (Kiivskii Medichnii Institut, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 20, Mar.-Apr. 1974, p. 227-231. 10 refs. In Ukrainian.

A74-29119 # Relations between some electrocardiogram indices and blood electrolytes in healthy individuals (Pro vzamozv'iazok mizh deiakimi pokaznikami elektrokardiogram i elektro-

litami krovi u zdorovikh osib). V. G. Selivonenko (Zaporiz'kii Medichnii Institut, Zaporozhe, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 20, Mar.-Apr. 1974, p. 245-247. 12 refs. In Ukrainian.

A74-29120 # Technique of cardiac rhythm analysis using a small computer (Metodika analizu sertshevogo ritmu iz zastosuvaniem maloi EOM). V. V. Sirots'kii, O. P. Vetrov, and V. V. Garbovs'kii (Akademii Nauk Ukrain'skoi RSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 20, Mar.-Apr. 1974, p. 254-257. 20 refs. In Ukrainian.

Some static indices of cardiac rhythm are presented that have proved informative and have been used in human and animal functional-condition diagnosis. The sensitivity of the static indices was determined by their response to negligibly small, continuous increases in functional loads. A technique for the computer-aided processing of these indices is described.

M.V.E.

A74-29262 The transient respiratory effects in man of sudden changes in alveolar CO₂ in hypoxia and in high oxygen. J. P. Miller, D. J. C. Cunningham, B. S. Lloyd (Oxford University, Oxford, England), and J. M. Young (Oxford University, Oxford; Ministry of Defence (Navy), London, England). *Respiration Physiology*, vol. 20, Feb. 1974, p. 17-31. 52 refs.

Investigations conducted by Bouverot et al. (1965) showed that in the dog it is possible to separate central and peripheral components of respiratory effects by analysis of the responses to transients. The application of these approaches to intact man is studied. It is observed that initial decreases in ventilation in response to sudden diminutions in chemical drive often did not follow the pattern found in the steady state, the changes in frequency being less than expected.

G.R.

A74-29263 A new technique for recording respiratory transients at the start of exercise. E. E. Davies, H. L. Hahn, S. G. Spiro, and R. H. T. Edwards (Royal Postgraduate Medical School, London, England). *Respiration Physiology*, vol. 20, Feb. 1974, p. 69-79. 21 refs. Research supported by the Royal Medical Council.

A respiratory mass spectrometer has been used to measure the composition of tidal gas at the mouth. Expired gas flow has been determined with a pneumotachograph. Gas exchange was calculated breath-by-breath with a small capacity digital computer from measurements of flow and composition. The sensitivity of the flow meter was checked continuously using an inspiratory gas meter and two simultaneous, nitrogen balances. A 'sliding gate' averaging technique was used to reduce random variation. Measurements of gas exchange made with the above technique agreed within plus or minus 10% with those based on conventional methods of expired gas collection and chemical analysis both in stable and changing respiratory states, at rest and during exercise.

(Author)

A74-29349 # The role of factors of professional activity in the development of certain nosological forms of diseases in an air crew (O roli faktorov professional'noi diatel'nosti v razvitii nekotorykh nozologicheskikh form zabojevanii u letnogo sostava). M. D. Viadro. *Voenno-Meditsinskii Zhurnal*, Feb. 1974, p. 53-55. In Russian.

A74-29351 # A constant-field interrupted resonance system for percutaneous electromagnetic measurement of blood flow. A. Kolin, R. N. Macalpin (California, University, Los Angeles, Calif.), J. R. Steele (California, University, Los Angeles; Medical Testing Systems, Inc., Beverly Hills, Calif.), and J. S. Imai (California State College, Dominguez Hills; Medical Testing Systems, Inc., Beverly Hills, Calif.). *National Academy of Sciences, Proceedings*, vol. 71, Apr. 1974, p. 1294-1298. 13 refs. Research supported by the Medical Testing Systems, Inc.

A combination of deformable flow probes of negligible lateral dimensions with an electronic circuit capable of providing a

prolonged plateau of $dB/dt = 0$ and of sampling the flow signal at the end of this interval permits electromagnetic measurement of blood flow with a reliable zero base line secured by switching off the magnet. An extracorporeal magnet provides the magnetic field. The flow transducer is introduced into the vascular system percutaneously through a standard angiographic catheter by conventional technique. The idea of the current generator can be described as 'principle of interrupted resonance'. The current wave form can be described as a sequence of disconnected bisected sine waves joined at the apices by horizontal current plateaus where di/dt is strictly zero. (Author)

A74-29391 Ketamine - An anesthetic agent in cases of catastrophe and emergencies (Ketamin - Ein Anästhetikum für Katastrophen- und Notfallsituationen). F. W. Ahnefeld, H. Haug, and H. H. Israng (Ulm, Universität; Bundeswehrkrankenhaus, Ulm, West Germany). *Wehrmedizinische Monatsschrift*, vol. 18, Apr. 1974, p. 108-112. 24 refs. In German.

Since a few years Ketamine is available as a high potent anesthetic agent. The report informs about pharmacology, indications and contra-indications. The emphasis lies on the suitability regarding medicine in cases of catastrophe and emergencies: little need for apparatus, relatively small risk, possibility of intramuscular application, advantageous effects on heart and circulation in cases of shock and burns. Beside the problems of mono-anesthesia with Ketamine the possibilities of the combination with other anesthetic agents are discussed. (Author)

A74-29449 Coronary artery calcification - Clinical implications and angiographic correlates. R. I. Hamby, F. Tabrah, B. G. Wisoff, and M. L. Hartstein (Long Island Jewish-Hillside Medical Center, New Hyde Park; New York, State University, Stony Brook, N.Y.). *American Heart Journal*, vol. 87, May 1974, p. 565-570. 18 refs.

Study of 250 patients with angiographically proved arteriosclerotic heart disease and 250 patients with normal coronary angiograms, aimed at assessing the significance of coronary artery calcification. The results include the finding that patients with double- or triple-vessel disease are more likely to have coronary artery calcification than are patients with single-vessel disease. M.V.E.

A74-29450 The exercise test as a diagnostic and therapeutic aid. D. R. Rosing (George Washington University Medical Center, Washington, D.C.), N. Reichek, and J. K. Perloff (Pennsylvania, University, Hospital, Philadelphia, Pa.). *American Heart Journal*, vol. 87, May 1974, p. 584-596. 122 refs.

Review of some of the essential considerations relevant to the optimal use of exercise or stress testing as a diagnostic, therapeutic, and investigative aid in clinical cardiology. The considerations reviewed include the normal physiologic responses to exercise, the design of exercise protocols, and the many noncardiac factors which can affect the circulatory response to exercise. M.V.E.

A74-29539 # Use of a 'generalized performance characteristic' of the human operator in assessing the efficiency of ergatic control system (Vikorisnannia 'uzagal'nenoi robochoi kharakteristiki' liudini-operatora pri otsiniuvanii efektiivnosti ergatichnikh sistem keruvannia). A. M. Meleshev and V. V. Pavlov. *Avtomatika*, vol. 19, Jan.-Feb. 1974, p. 49-51. In Ukrainian.

A74-29540 # One of the classes of adaptive human-operator models in control systems (Pro odin z klasiv adaptivnikh modelei liudini-operatora v sistemi keruvannia). A. V. Timofeev and V. A. Iakubovich. *Avtomatika*, vol. 19, Jan.-Feb. 1974, p. 52-65. 7 refs. In Ukrainian.

Consideration of the construction principles for mathematical models of a human operator intended to perform compensatory- and pursuit-tracking functions while he is having only incomplete information on the characteristics of the environment and control

plant and while he is adapting to ongoing changes in these characteristics. Experimental computer-modeling results are presented for adaptation of these models in the case of control exercise upon a dynamic control plant under conditions of uncertainty. Analog experiments are described with a test group, and the functional patterns of the models are compared with the adaptive behavior of the human operators while they perform compensatory-tracking and pursuit-tracking functions. M.V.E.

A74-29661 # Temperature distribution in a human body in a state of general deep hyperthermia (Raspredelenie temperatury v tele cheloveka pri obshchei glubokoi gipertermii). O. V. Korobko and T. L. Perel'man (Nauchno-Issledovatel'skii Institut Onkologii i Meditsinskoi Radiologii, Minsk, Belorussian SSR). *Inzhenerno-Fizicheskii Zhurnal*, vol. 26, Mar. 1974, p. 523-528. 6 refs. In Russian.

A74-29824 Visual persistence - Effects of flash luminance, duration and energy. R. W. Bowen, J. Pola, and L. Marin (Columbia University, New York, N.Y.). *Vision Research*, vol. 14, Apr. 1974, p. 295-303. 22 refs. NSF Grant No. GB-5947; Grant No. NIH-5-RO1-EY-00375.

Dark-adapted observers reported whether the offset of a test flash (30/min to the right of fixation) occurred before or after the onset of a probe flash (2 deg 30 min to the left of fixation) as the interstimulus interval was varied. Visual persistence (the interstimulus interval at the point of subjective equality for test flash offset/probe flash onset) was found to decrease with either increases in flash duration or flash luminance. These effects were shown to be independent of differential visual latencies to the onsets of flashes. For equal-energy flashes (variable luminance and duration) persistence was constant up to 100 msec, and thereafter declined linearly with log flash duration, a result attributable to changes in the shape of the function relating persistence to flash duration at lower luminances. F.R.L.

A74-29825 Visual sensitivity to disparity pulses - Evidence for directional selectivity. K. I. Beverley and D. Regan (Keele, University, Keele, Staffs., England). *Vision Research*, vol. 14, May 1974, p. 357-361. 8 refs. Research supported by the Science Research Council and Medical Research Council.

When a target's retinal disparity changes with a pulsed waveform, the target appears to execute a pulsed movement in depth. Visual sensitivity to such disparity changes was plotted as a function of pulse duration. These curves resembled low-pass filter characteristics. For a given direction of movement in depth, different sensitivity curves were obtained for targets located in front of and behind the plane of binocular fixation. However, depth sensitivities were similar for pulses directed from either location towards the fixation plane or directed from either location away from the plane. This suggests that movements in depth directed towards and away from the fixation plane are handled by different neural mechanisms in man in accord with single-neuron evidence in cat and monkey. (Author)

A74-29852 Determination of local blood flow /microflow/ by electrochemically generated hydrogen - Construction and application of the measuring probe. K. Stossek, D. W. Lübbers, and N. Cottin (Max-Planck-Institut für Systemphysiologie, Dortmund, West Germany). *Pflügers Archiv*, vol. 348, no. 3, 1974, p. 225-238. 28 refs.

A74-29853 Human soleus muscle - A comparison of fiber composition and enzyme activities with other leg muscles. P. D. Gollnick (Washington State University, Pullman, Wash.), B. Sjodin, J. Karlsson, E. Jansson, and B. Saltin (Københavns Universitet, Copenhagen, Denmark). *Pflügers Archiv*, vol. 348, no. 3, 1974, p. 247-255. 28 refs. Research supported by the Swedish Sports Federation; Swedish Medical Research Council Grants No. 40X-2203; No. 14X-4155.

A74-29854 Iontophoretic application of acetylcholine - Advantages of high resistance micropipettes in connection with an electronic current pump. F. Dreyer and K. Peper (Saarland, Universität, Homburg, West Germany). *Pflügers Archiv*, vol. 348, no. 3, 1974, p. 263-272. 19 refs. Research supported by the Deutsche Forschungsgemeinschaft.

A74-29867 Theoretical analysis of the CW Doppler ultrasonic flowmeter. W. R. Brody (National Institutes of Health, National Heart and Lung Institute, Bethesda, Md.) and J. D. Meindl (Stanford University, Stanford, Calif.). *IEEE Transactions on Bio-medical Engineering*, vol. BME-21, May 1974, p. 183-192. 19 refs.

Based on the statistical scattering properties of blood, this theoretical model predicts the character of the backscattered ultrasound waveforms picked up at the receiving transducer. Because of its generality, this approach permits the investigation of a variety of pertinent questions regarding the Doppler flowmeter family. The power spectrum of the received signal, showing the distribution of Doppler shifts in the backscattered ultrasound, plays a central role in the theory of the Doppler flowmeter. The spectrum contains all the available information concerning the flow of blood through the transducer beams. One of the key features of this investigation is the demonstration that blood flow estimation for the CW flowmeter reduces to a problem of power spectral estimation. F.R.L.

A74-29892 Computer processing of diagnostic ultrasound data. D. H. McSherry (Digicon, Inc., Houston, Tex.). *IEEE Transactions on Sonics and Ultrasonics*, vol. SU-21, Apr. 1974, p. 91-97. 7 refs.

A system has been developed to improve the image quality of diagnostic ultrasound data obtained from conventional ultrasound scanners. Echoes are initially recorded on a wideband analog magnetic tape recorder and subsequently digitized through the use of a high speed analog-to-digital converter. Computer processing is then used to increase resolution and to enhance coherent energy echoes. The final display contains echo amplitude and structure information as well as indicating echo position. Signal processing techniques used thus far include averaging, bandpass filtering, and inverse filtering. Coherent energy echoes are enhanced by averaging and by applying bandpass filters in the appropriate frequency region. Resolution of echoes is increased through inverse filtering, an operation which increases the bandwidth of the data. (Author)

A74-30021 # Some general principles for studying the combined effect of space flight factors (Nekotorye obshchie printsipy izucheniia kombinirovannogo deistviia faktorov kosmicheskogo poleta). B. I. Davydov and V. V. Antipov. *Kosmicheskie issledovaniia*, vol. 12, Mar.-Apr. 1974, p. 285-298. 48 refs. In Russian.

Basic principles for analyzing the combined effect of ambient stress factors on the human organism are formulated with emphasis on the quantitative aspects of the problem. Stress factors encountered in space flights are classified. Levels and types of interaction are defined, together with the principal parameters used to assess the biological end effect of interaction. The experimental evaluation of the combined effect of stress factors is discussed, along with the selection of the proper stress factors for a specified mission. The need to develop adequate models for predicting the response of the human organism to various space-flight situations is emphasized. V.P.

A74-30028 Physiological responses to standardised arm work. C. T. M. Davies and A. J. Sargeant (London School of Hygiene and Tropical Medicine, London, England). *Ergonomics*, vol. 17, Jan. 1974, p. 41-49. 30 refs.

Eight healthy male subjects were used to study physiological responses to one- and two-arm cranking exercise on a suitably modified stationary bicycle ergometer under carefully standardized conditions. Apparent mechanical efficiency (ratio of work performed to aerobic energy expended) was found to be similar at low levels of exercise to that previously found for leg work, namely 0.25. Minute ventilation was higher in arm work than in leg work for a given

oxygen intake. The cardiac output remained the same for a given oxygen intake, although stroke volume was reduced and cardiac frequency increased in arm work when compared with leg work.

T.M.

A74-30029 Tracking decrement as a result of grip holding endurance. D. S. Blawieck (U.S. Army, Picatinny Arsenal, Dover, N.J.) and N. C. Ellis (Texas A & M University, Bryan, Tex.). *Ergonomics*, vol. 17, Jan. 1974, p. 51-57. 7 refs.

This study explores the feasibility of using the static strength and endurance relationships suggested by Rohmert in 1960 to predict pursuit tracking performance. Ten male subjects are tested on a pursuit rotor before and after being subjected to specific levels of loading on a grip holding device. The loading corresponded to specific levels of each subject's maximum endurance as determined from Rohmert's strength and endurance equation. The hypotheses are: (1) predetermined schedules of strength expenditure cause a systematic decrement in tracking efficiency; and (2) the process of recovering efficiency is dependent upon the expenditure schedules. Resulting data support these hypotheses, suggesting that tracking efficiency can be reliably predicted using some of the strength and endurance relationships postulated by Rohmert. (Author)

A74-30030 The interaction of the loss of a night's sleep with mild heat - Task variables. E. C. Poulton, R. S. Edwards, and W. P. Colquhoun (Medical Research Council; Applied Psychology Unit, Cambridge, England). *Ergonomics*, vol. 17, Jan. 1974, p. 59-73. 19 refs.

Twelve men performed three tasks after one night without sleep, at 38/32 C, and with the two stresses combined, as well as in a control condition. The three tasks were tracking with peripheral lights, the five choice task, and an auditory vigilance task, in that order. There was a reliable interaction between the two stresses, but only at the start of the auditory vigilance task. Here the detrimental effect of the 2 stresses combined was reliably less than the sum of the two separate detrimental effects. There were also differences between the three tasks in the direction of the change in the interaction over time, and in the time taken to show reliable effects of the stresses. (Author)

A74-30031 An improved simple exercise test for evaluation of physical fitness. S. R. Datta, B. B. Chatterjee, and B. N. Roy (All-India Institute of Hygiene and Public Health, Calcutta, India). *Ergonomics*, vol. 17, Jan. 1974, p. 105-112. 6 refs.

A simple exercise test for estimating physical fitness is described. It seems superior to the standard Harvard Step Test for three reasons: (1) it is extremely simple to administer; (2) it does not limit subjects' performance largely through local muscular fatigue; and (3) no special equipment is necessary for its performance. This test also seems to be able to appraise subjects' fitness better than the Harvard Test. (Author)

A74-30032 Oxygen uptake calculated from expiratory volume and oxygen analysis only. F. Croonen and R. A. Binkhorst (Nijmegen, University, Nijmegen, Netherlands). *Ergonomics*, vol. 17, Jan. 1974, p. 113-117. 6 refs.

A74-30490 Simple kinetic information for transparent depth. W. M. Mace (Trinity College, Hartford, Conn.) and R. Shaw (Minnesota, University, Minneapolis, Minn.). *Perception and Psychophysics*, vol. 15, no. 2, Apr. 1974, p. 201-209. 9 refs. Research supported by the University of Minnesota; NSF Grant No. GB-17590; Grants No. PHS-HD-01136; No. PHS-HD-0098.

The present paper reports three investigations of new kinetic information for transparent depth using computer-generated dot patterns. An initial demonstration showed that separation in depth could be obtained by translating rectangular lattices of dots through one another like intersecting columns of marching soldiers. The first two experiments showed that diagonal interactions between lattices created significantly stronger separation than did horizontal or

vertical interactions (horizontal was, in turn, stronger than vertical), and that patterns which translated through one another without any of the individual elements intersecting were better separated than those whose rows or columns intersected in register. The third experiment showed that random patterns intersecting in any direction created the strongest separations of all the patterns observed. Results were taken to indicate that a unified theory of depth information, developed in the context of James Gibson's ecological optics, must incorporate both spatial and kinetic structure in its specification of necessary and sufficient stimulus conditions. (Author)

A74-30491 Visual recognition as a function of stimulus offset asynchrony and duration. L. S. Cohene and H. P. Bechtoldt (Iowa, University, Iowa City, Iowa). *Perception and Psychophysics*, vol. 15, no. 2, Apr. 1974, p. 221-226. 18 refs.

The stimuli consisted of two complementary dot patterns that formed a bigram when they were flashed simultaneously; impairment of letter recognition developed when one of the patterns was briefly extended beyond the termination of the other (stimulus offset asynchrony). However, if the ratio of stimulus offset asynchrony to bigram duration remained constant, the probability of a correct recognition response also remained constant as duration varied over a 50- to 100-msec interval. When percent stimulus asynchrony increased, the impairment increased. An interaction between bigram letter position and each of bigram duration and percent stimulus asynchrony was observed with recognition accuracy greater in general for the letter in the left half of the field. (Author)

A74-30492 The effect of orientation in binocular contour rivalry of real images and afterimages. N. J. Wade (Dundee, University, Dundee, Scotland). *Perception and Psychophysics*, vol. 15, no. 2, Apr. 1974, p. 227-232. 12 refs. Research supported by the Science Research Council.

Binocular rivalry was investigated using gratings of different orientations in three experiments. No consistent effects of orientation were found for predominance measures of rivalry between real images. Rivalrous afterimages, on the other hand, did exhibit orientation selectivity: vertical gratings were visible for longer than were 45-deg gratings. This effect was compared to the similar orientation selectivity found for monocular observation of grating afterimages. Comparisons of binocular rivalry between real images and afterimages were made in terms of the frequency distributions of the dominance periods. (Author)

A74-30493 Stereospatial masking and aftereffect with normal and transformed random-dot patterns. N. Long and R. Over (Queensland, University, St. Lucia, Australia). *Perception and Psychophysics*, vol. 15, no. 2, Apr. 1974, p. 243-248. 20 refs.

Masking and aftereffect in the perception of binocular depth were studied using random-dot stereograms as adaptation and target stimuli. Detection of the target was impaired by prior adaptation only when the two stimuli differed in disparity by less than 2 minarc. The masking function was unaffected by unocular enlargement and blurring within the adaptation stimulus, but masking was no longer selective to disparity when the elements seen by the two eyes were reversed in brightness. The stereoscopic depth aftereffect was also insensitive to unocular enlargement and blurring, and could not be generated when there was brightness complementation within the adaptation stimulus. Both the masking and aftereffect data are interpreted as evidence that stereospatial detectors in human vision are insensitive to transforms that maintain luminance-spatial correlations in binocular input. (Author)

A74-30494 Contour displacements and tracking errors - Probing 'twixt Poggendorff parallels. L. Tong and D. J. Weintraub (Michigan, University, Ann Arbor, Mich.). *Perception and Psychophysics*, vol. 15, no. 2, Apr. 1974, p. 258-268. 17 refs. NSF Grant No. GB-8181; Grant No. PHS-K2-MH-35253.

Explanations of the Poggendorff effect were tested by varying the separation between outer parallels and by adding interior parallels. Error decreased with the addition of interior parallels,

which can be explained by repulsion of parallels. A strong linear trend existed for judgmental error in millimeters plotted against separation between outer parallels. The nonzero intercept of a best-fit line and the slight nonlinearity of the data suggest a hypothesis of contour repulsion between parallels at moderate separations coupled with mistracking of the transversal across the region between parallels. Since the Poggendorff effect was independent of viewing distance, perceptual errors cannot be explained by purely peripheral mechanisms. A true intersection between transversal and parallel was the most critical feature of a display. Inverting a display increased the mean error. (Author)

A74-30495 Variability of magnitude estimates - A timing theory analysis. D. M. Green (California, University, La Jolla, Calif.) and R. D. Luce (California, University, Irvine, Calif.). *Perception and Psychophysics*, vol. 15, no. 2, Apr. 1974, p. 291-300. 32 refs. NSF-supported research.

Three procedures for magnitude estimation were investigated, and a sufficient number of responses were obtained to make reasonable estimates of both the mean and variance of the responses. The conventional magnitude estimate procedure, without a standard signal, appeared to produce the most sensible data. The best method of establishing the central tendency of the data appears to be the plot of the mean ratio of successive responses against the intensity ratio of the corresponding signal intensities. When this is done, the average response ratio increases roughly as a power function of the signal ratios. The coefficient of variation varies from about 0.1 for small signal ratios and increases to 0.3 at about 20 dB and greater signal separations. The distribution of response ratios appears to be reasonably well approximated by a beta distribution. The change in the coefficient of variation with signal ratio is suggestive of an attention mechanism in which the sample size depends on the location of the attention band. (Author)

A74-30496 The role of scanpaths in the recognition of random shapes. P. J. Locher and C. F. Nodine (Temple University, Philadelphia, Pa.). *Perception and Psychophysics*, vol. 15, no. 2, Apr. 1974, p. 308-314. 15 refs.

Eye movements of 12 Ss were examined during learning and recognition of two-dimensional random shapes to determine the nature of the memorial representation of a stimulus and the utilization of this memorial representation in pattern recognition. Specifically, the purpose of this study was to test the scanpath model of pattern perception by determining whether scanpaths exist and, if so, how they influence recognition performance. Scanpaths, defined as overlapping fixation patterns in learning and recognition tasks, were observed in over half of all eye-movement records regardless of shape complexity. Presence of scanpaths did not increase recognition performance as measured by errors in recognition and Ss' ability to reproduce the shapes. Although scanpaths did not influence recognition performance, their occurrence implicates them as a potential factor in the recognition process. (Author)

A74-30497 A tactile illusion - The rotating hourglass. K. N. Jones, C. F. Gettys (Oklahoma, University, Norman, Okla.), and R. M. Touchstone (FAA, Civil Aeromedical Institute, Oklahoma City, Okla.). *Perception and Psychophysics*, vol. 15, no. 2, Apr. 1974, p. 335-338.

A new tactile (more properly termed haptic) illusion, the rotating hourglass, was investigated in the laboratory by rotating a rod end for end between the S's thumb and forefinger. This illusion, which is an apparent decrease in the diameter of the rod at the point of contact with the fingers, was easily observed by 19 of the 20 Ss. When the illusion was studied as a function of time, the magnitude of the illusion increased over time with a mean decrease in apparent diameter of 52.3% from the beginning to the end of the 38-sec trials. A theory of differential adaptation of the skin is postulated to explain the rotating hourglass illusion and a similar illusion. (Author)

A74-30498 Oculomotor adjustments and size-distance perception. M. K. Komoda (New School for Social Research, New York, N.Y.) and H. Ono (York University, Toronto, Canada). *Perception and Psychophysics*, vol. 15, no. 2, Apr. 1974, p. 353-360. 33 refs. National Research Council of Canada Grant No. A-0296.

The relationship between perceived size and distance and oculomotor adjustments were assessed in two experiments. In both experiments, Ss were required to make scalar linear size, angular size, and distance judgments of stimuli subtending a constant retinal image size at different levels of convergence. The results of the first experiment indicate that the perceived linear size, angular size, and distance of the stimulus decreased with increased convergence, the decrease in perceived linear size being greater than that of perceived angular size. While again showing a decrease in perceived linear and angular size, the results of the second experiment also show that there was a smaller decrease in perceived distance with increased convergence when Ss continued to view the stimulus as convergence was changed than when they did not view the stimulus as convergence was changed. The implications these results have for size and distance perception are discussed. (Author)

A74-30499 Foveal light-detection thresholds with two temporally spaced flashes - A review. R. M. Herrick (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). *Perception and Psychophysics*, vol. 15, no. 2, Apr. 1974, p. 361-367. 28 refs.

The literature on the interaction of two successive identical subliminal flashes in determining the light detection threshold is reviewed. Four empirical equations, collectively termed the TEpee effect, give a good description of the data on several studies. The TEpee effect describes detection data obtained with several background luminances, with a variety of flash durations, with different colors, with decrements as well as with increments (flashes), and with both monocular and binocular viewing. The TEpee effect also describes detection data obtained with multiple identical flashes, with two electrical pulses (phosphene threshold), with response latency measures, with critical flicker frequency, and, possibly, with the interaction of two supraliminal flashes. The TEpee effect is limited to identical flashes presented foveally. It does not describe the interaction of nonidentical flashes, nor does it describe the interaction of flashes in the peripheral retina. (Author)

A74-30604 # Life support system for the Spacelab. R. G. Reichert. *Dornier-Past* (English Edition), no. 2, 1974, p. 46-49.

The system includes in particular air conditioning (temperature and humidity control) for the laboratory, monitoring and removal of CO₂, odors, and trace elements, monitoring of all air pollutants capable of becoming a hazard, cooling of all heat-generating units and experiments within the module, and replenishment of the air that is consumed or lost through leaks and the use of the air lock. What is fundamentally new about the Spacelab compared with all past and present space vehicles is that scientists will be able to work in it without great training as astronauts. This presupposes that the vehicle will contain an atmosphere similar to that on the earth.

F.R.L.

A74-30626 Utility of several clinical tests of color-defective vision in predicting daytime and nighttime performance with the aviation signal light gun. J. A. Steen, W. E. Collins, and M. F. Lewis (FAA, Aviation Psychology Laboratory, Oklahoma City, Okla.). *Aerospace Medicine*, vol. 45, May 1974, p. 467-472. 12 refs.

A74-30627 Decompression study and control using ultrasonics. G. J. Rubissow and R. S. Mackay (Boston University, Boston, Mass.). *Aerospace Medicine*, vol. 45, May 1974, p. 473-478. 26 refs.

By direct ultrasonic observation on intact human and animal subjects, it was demonstrated that bubbles are involved in decompression sickness, and these may appear at the site of discomfort rather than being only central. On many dives, bubbles first appeared in the blood in fatty tissue, but on short dives first bubbles were seen

in muscle tissue. Recompression bubble showers were seen. Silent bubbles were demonstrated, and also safe ascent using ultrasonically controlled decompression to limit bubble size to a threshold value. Overpressure can be measured in individual tissues by adjusting ambient pressure so that bubbles there neither decay nor grow. With 7.5 MHz ultrasound, 1 micron and larger bubbles were routinely seen. Some optical comparisons were made in transparent fish, and goldfish were found able to survive severe bubble formation.

(Author)

A74-30628 Effect of cold hands on an emergency egress procedure. J. R. Allan, P. Marcus, and C. Saxton (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). *Aerospace Medicine*, vol. 45, May 1974, p. 479-481. 9 refs.

Experiments were undertaken to obtain a numerical measurement of the effect of cold hands on performance of an emergency egress procedure. The results show that egress times will increase from practiced control levels (+10 C) after about 5 min in an environment of -30 C, 8 min in -20 C, and 14 min in -10 C. Egress time is doubled after 14, 37, and 57 minutes respectively in the same conditions. The experiments also showed that the duration of cold exposure had important effects on egress performance by an effect other than the lowering of finger surface temperature, which suggests that the cooling of other structures in the hands or forearms may have an important influence on manual performance. (Author)

A74-30629 Progressive deterioration in short-term memory while breathing pure oxygen at normal atmospheric pressure. E. C. Poulton (Medical Research Council, Applied Psychology Unit, Cambridge, England). *Aerospace Medicine*, vol. 45, May 1974, p. 482-484. 7 refs. Research supported by the Medical Research Council.

A74-30630 Optical effects of pigmentation on temperature rise in a two-layer skin simulant system during irradiation. J. R. Piergallini and A. M. Stoll (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). *Aerospace Medicine*, vol. 45, May 1974, p. 485-490. 8 refs.

A74-30631 * Orthostatic tolerance in dehydrated, heat-acclimated men following exercise in the heat. J. E. Greenleaf, J. S. Bosco, and M. Matter, Jr. (NASA, Ames Research Center, Laboratory of Human Environmental Physiology, Moffett Field, Calif.). *Aerospace Medicine*, vol. 45, May 1974, p. 491-497. 37 refs.

A74-30632 * Changes in mesenteric, renal, and aortic flows with +Gx acceleration. H. L. Stone, H. H. Erickson, and H. Sandler (Texas, University, Galveston, Tex.). *Aerospace Medicine*, vol. 45, May 1974, p. 498-504. 18 refs. Grant No. NGR-44-088-002. NASA Order A-94544.

Previous studies in man and dogs have indicated that the splanchnic bed might contribute to the maintenance of arterial pressure during +Gx acceleration. Eight mongrel dogs were chronically instrumented with Doppler flow probes around the superior mesenteric (SMA) and renal arteries (RA) as well as the terminal aorta (TA). A solid-state pressure transducer was placed in the aorta distal to the flow probe. Using alpha-chloralose anesthesia following a 2-4 week recovery period, the animals were subjected to 120 sec at levels of 5, 10 and 15 +Gx acceleration on a 7.6-m radius centrifuge. The results indicate that both an active component and a mechanical component contribute to the maintenance of arterial pressure during +Gx acceleration. (Author)

A74-30633 Doppler ultrasound monitoring of venous gas bubbles in pigs following decompression with air, helium, or neon. M. R. Powell (Ocean Systems, Inc.; Union Carbide Technical Center, Tarrytown, N.Y.). *Aerospace Medicine*, vol. 45, May 1974, p. 505-508. 12 refs. Contract No. N00014-72-C-0189.

A74-30634 * Effect of bioisolation and the intestinal flora of mice upon evaluation of an Apollo diet. T. D. Luckey, M. H. Bengson (Missouri, University, Columbia, Mo.), and H. Kaplan (Missouri, University, Columbia, Mo.; Muhlenberg Hospital, Plainfield, N.J.). *Aerospace Medicine*, vol. 45, May 1974, p. 509-518. 13 refs. NASA-supported research.

A74-30635 Serum enzyme level changes in pigs following decompression trauma. M. R. Powell, G. F. Doebbler, and R. W. Hamilton, Jr. (Ocean Systems, Inc.; Union Carbide Technical Center, Tarrytown, N.Y.). *Aerospace Medicine*, vol. 45, May 1974, p. 519-524. 24 refs. Contract No. N00014-69-C-0346.

Changes in the serum levels of creatine phosphokinase and lactate dehydrogenase have been investigated with respect to their potential use as indicators of decompression sickness and injury. Pigs were decompressed on profiles of graded severity using either air, neon-oxygen, or helium-oxygen as the compression gas. Severity was increased by reducing time spent at the last decompression stop. While large changes in serum levels of CPK and LDH were found with the air-dived pigs, these changes were also found in the absence of signs of decompression sickness. By contrast, enzyme level changes were not found in those cases where the pigs were compressed with neon or helium-oxygen, even if the signs of trauma were clearly evident. It is postulated that the increases of CPK and LDH are the result of myocardial injury by venous bubbles in large number.

(Author)

A74-30636 Effect of adrenergic drugs on pulmonary responses to high-pressure oxygen. R. E. Hammond and T. K. Akers (North Dakota, University, Grand Forks, N. Dak.). *Aerospace Medicine*, vol. 45, May 1974, p. 525-528. 16 refs. Research supported by the University of North Dakota; Contract No. N00014-68-A-0499, NR Project 101-753.

Adult, male Sprague-Dawley rats were divided into groups of 10 and pretreated daily for 3 days with drugs known to alter adrenergic function. Half the animals were exposed to OHP (5 ATA O₂-13 ATA He) for 30 min. The rest were exposed to a mixture of 20% O₂-80% He at 1 ATA for 30 min. Total lung water contents were compared following experimental exposure. Groups pretreated with phentolamine, reserpine, and a combination of phentolamine, propranolol, reserpine, imipramine, and tyramine had significantly less lung water than controls following OHP exposure. It is concluded that alpha-adrenergic blockade and peripheral catecholamine depletion have protective value in preventing pulmonary damage during OHP exposure.

(Author)

A74-30637 * Adrenocortical responses of the Apollo 17 crew members. C. S. Leach, P. C. Rambaut (NASA, Johnson Space Center, Houston, Tex.), and P. C. Johnson (Baylor University; Methodist Hospital, Houston, Tex.). *Aerospace Medicine*, vol. 45, May 1974, p. 529-534. 11 refs. Contracts No. NAS9-11201; No. NAS9-7280; Grant No. NIH-HE-05435-11.

Changes in adrenal activity of the three Apollo 17 crew members were studied during the 12.55-day mission and during selected post-recovery days. Aldosterone excretion was normal early and elevated later in the mission, probably causing a loss in total body exchangeable potassium. There was decreased 17-hydroxycorticosteroid excretion only during the early mission days for the two moon landers and throughout the mission for the other astronaut. Cortisol excretion was elevated on physically stressful mission days. At recovery, plasma ACTH was elevated without a similar increase in plasma cortisol. Angiotensin I activity was elevated at recovery in only one crewman. This crewman was the only one with a decreased extracellular fluid volume. These results indicate that the mission and its activities affect adrenal function of the crewmen.

(Author)

A74-30638 Feeding biorhythm alterations in heat-stressed rats. B. J. Chou and E. L. Besch (Kansas State University of Agriculture and Applied Science, Manhattan, Kan.). *Aerospace*

Medicine, vol. 45, May 1974, p. 535-539. 22 refs. Research supported by the Kansas State University; Contract No. F44620-68-C-0020.

Heat stress conditions used resulted in 100% mortality between days 4 and 20 of exposure. Food consumed was about 21% and 25% (n.s.) during the light period by control and heat-stressed animals, respectively. However, during 3 days immediately preceding death, food intake increased significantly to about 41% during the 12 hr of light. Analyzing our data with appropriate mathematical transformation techniques (Fourier) showed us changes in both the amplitude and shape of the feeding rhythm. The amplitude of the rhythm for heat-stressed rats decreased 11.9% the 3 days immediately preceding death. During the same period, the shape of the feeding-rhythm curve deviated 42% from the control curve. Thus, it appears that physiological deterioration of rats exposed to heat stress may be detected from analyses of relative food intake rhythms. (Author)

A74-30639 Age and vestibular function. F. L. van der Laan and W. J. Oosterveld (Keel-, Neve- en Oorheelkundige Kliniek, Amsterdam, Netherlands). *Aerospace Medicine*, vol. 45, May 1974, p. 540-547. 40 refs.

Caloric vestibular tests were conducted in 334 healthy human test subjects of various ages. The subjects were divided into groups according to age. Differences in response to caloric stimulations in these groups were determined. The sequence of the four different irrigations proved to have an effect on the results. In young people, a nystagmus with a small frequency and a large amplitude was found; however, in older people the nystagmus had a higher frequency but a smaller amplitude. Rotation tests, by means of a torsion swing, were performed in 779 humans. In these subjects, an effect of age was found in the frequency, the amplitude, and the speed of both the slow and the quick phase of the nystagmus. The clinical consequences of the findings are discussed.

(Author)

A74-30640 Effect of barometric pressure change on the ear following stapedectomy. H. H. Hanna and F. G. Collins (USAF, School of Aerospace Medicine, Brooks AFB, Ohio). *Aerospace Medicine*, vol. 45, May 1974, p. 548-550. 16 refs.

The extent to which the ear can tolerate barometric pressure changes following stapedectomy was studied in Cebus monkeys. Surgery was performed on 51 animals; a wire or wire-pistol prosthesis, with either vein or gelfoam pad, was used. The animals were observed for 1 year to ensure complete healing; each was then subjected to a severe barometric pressure change profile. Approximately 48 hr later, exploratory tympanotomy was carried out to see if an oval window fistula had occurred. The usual finding was extensive fibrosis in the oval window area. Histopathologic study of the temporal bones revealed thin membranes (comparable to humans) in only 25% of the study group. No fistulae were found, but it was concluded that the predominance of thick membranes made applicability of humans impossible.

(Author)

A74-30641 * Untoward effects of a sympathomimetic amine. C. E. Billings (NASA, Ames Research Center, Moffett Field, Calif.), R. H. Ralston (The Niles Clinic, Niles, Ohio), and D. E. Hare (Hopkins Airport Medical Clinic, Cleveland, Ohio). *Aerospace Medicine*, vol. 45, May 1974, p. 551, 552.

Presentation and discussion of a clinical report describing asymptomatic multifocal ventricular premature contractions in a professional pilot. He had been taking heavy doses of a systemic decongestant agent, pseudoephedrine, prescribed by a physician. He was taken off the medication, and over the next few days the PVCs became less frequent, then disappeared. It is pointed out that physician's instructions to pilots must be given with the realization that some airmen may follow the instructions too zealously in an attempt to remain on flying status.

P.T.H.

A74-30642 Human factors of aircraft slide/raft combinations. J. A. Sirkis, S. R. Mohler, and E. Podolak (FAA, Office of

Aviation Medicine, Washington, D.C.). *Aerospace Medicine*, vol. 45, May 1974, p. 553-558. 6 refs.

Emergency escape equipment for air transport aircraft was limited to ditching considerations prior to World War II. During the war, the ditching equipment was markedly improved. About the same time, nosegear air transport aircraft began evolving, and escape equipment for land emergencies became necessary. A progression from knotted ropes through rope ladders and canvas slides to inflatable escape slides occurred as aircraft got larger. A concomitant improvement in ditching equipment has occurred as aircraft passenger capacity has increased to the present wide-body models. The next logical step is to combine the emergency escape slide and the life raft in one unit, enabling (1) a significant improvement in deployment efficiency during water emergencies, and (2) a significant overall saving in equipment weight. (Author)

A74-30788 # Double discharges of motoneurons in man (Dvoynye razriady motoneironov u cheloveka). L. P. Kudina (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR). *Neirofiziologiya*, vol. 6, Mar.-Apr. 1974, p. 152-160. 21 refs. In Russian.

Records of motor unit potentials of musculus trapezius and musculus rectus femoris, at weak and moderate voluntary isometric contractions, obtained by means of bipolar needle electrodes, are reviewed. Double discharges were found mostly in cases of high-threshold motor units. In musculus trapezius, the mean duration of double discharge intervals was significantly lower, and the frequency of their occurrence was considerably higher than in musculus rectus femoris. A comparison of the results obtained with those published by other investigators shows that there exists a correlation between the duration of the double discharge interval and the duration of a delayed motoneuron depolarization. M.V.E.

A74-30789 # Vision analysis in nonspecialized receptive fields as an expansion into a series of orthogonal base functions (Zritel'nyi analiz v nespetsializirovannykh retseptivnykh poliakh kak razlozhenie po ortogonal'nym bazisnym funktsiiam). A. S. Blaivas (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR). *Neirofiziologiya*, vol. 6, Mar.-Apr. 1974, p. 211-218. 16 refs. In Russian.

A linear mathematical model of retinal receptive fields, developed on the basis of simple and experimentally corroborated assumptions, is presented. The main assumptions are that: (1) the retinal receptive fields have round or elliptic concentric shapes; and (2) frequency filtration takes place in receptive fields. Computation results suggest the existence of retinal image expansions into rapidly converging Jacobi polynomial series. The proposed model provides nondynamic approximations for many neurophysiological parameters. It also describes receptive fields of the off, on, and on-and-off types, as well as receptive fields that have a third disinhibitory zone. Some unusual results predicted by the model are in need of experimental corroboration. M.V.E.

A74-30800 # Tolerance to breathing oxygen under excessive pressure (O perenosimosti dykhaniiia kislorodom pod izbytochnym davleniem). S. F. Raev. *Voenno-Meditsinskii Zhurnal*, Mar. 1974, p. 60, 61. In Russian.

One-hundred and forty pilots, ranging in age from 26 to 45 years, were tested for their ability to withstand oxygen breathing under heavy pressure. Of these subjects, 40 were previously diagnosed as suffering from first degree hypertension, while the remaining 100 were in good health. It was noted that only among the hypertonic subjects were there considerable decreases in tolerance to breathing under heavy pressure. In most of these cases, this decrease in tolerance was accompanied by changes in such physiological parameters as blood pressure and electrocardiograms, but only rarely did the subject himself note any worsening of his well-being. It is warned that unless such parameters are tested during training, it may

be erroneously concluded that an airman is capable of enduring oxygen breathing under heavy pressure because he shows no initial signs to the contrary. P.T.H.

A74-31016 Sonic boom exposure effects - A field study on humans and animals. R. Rylander, S. Sorensen (National Environment Protection Board, Stockholm, Sweden), B. O. Andrae (Institute of Aviation Medicine, Linköping, Sweden), G. Chatelier (Centre d'Expériences Aériennes Militaires, Mont-de-Marsan, Landes, France), Y. Espmark (Stockholm, University, Stockholm, Sweden), T. Larsson (National Environment Protection Board, Solna, Sweden), and R. I. Thackray (FAA, Aviation Psychology Laboratory, Oklahoma City, Okla.). *Journal of Sound and Vibration*, vol. 33, Apr. 22, 1974, p. 471-486. 21 refs.

A field experiment was undertaken to study the reactions of humans after exposure to sonic booms with special reference to startle reactions. In addition, animals in the vicinity of the test site were observed and the extent of annoyance reactions in a community near the test site was determined. Female volunteers were used as test subjects and were exposed throughout one day to 5-12 booms, with an outdoor level varying between 60-640 Pa. The presence of startle reactions was assessed by using a hand-steadiness test, recordings of heart beat frequency and a tracking test. The animals were studied by filming, observations being recorded on tape. The results show that the presence of startle reaction in an individual is not correlated to boom levels studied. (Author)

A74-31084 # Causes of muscle work capacity increases during emotional stress in man (O prichinakh povysheniia myshetsnoi rabotosposobnosti pri emotsional'nom napriazhenii u cheloveka). O. L. Vinogradova, Ia. M. Kots, I. M. Rodionov, V. I. Tkhorovskii, and L. N. Shestakova (Moskovskii Gosudarstvennyi Universitet; Gosudarstvennyi Tsentral'nyi Institut Fizkul'tury; Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Mar. 1974, p. 321-328. 12 refs. In Russian.

The emotional stress caused in man by intense mental arithmetic exertions or similar mental efforts is shown to lead to increases in muscle work capacity during isometric muscle contraction induced by tetanic nerve stimulation. Thereunder, no change is brought about in the maximum force of the induced muscle contraction, but fatigue development is delayed. The 'emotional' increases in muscle work capacity during induced contraction are not attended by provable changes in the induced electric activity of the working muscles and cannot be explained by changes in the blood supply of these muscles. Some data suggest that muscular work-capacity increases during emotional stress in man are connected with biochemical changes in the state of muscle tissues induced by sympathetic cholinergic effects. M.V.E.

A74-31085 # Functional activity of the adrenal cortex in man during intensely emotional alternate shift work (Funktsional'naiia aktivnost' kory nadpocheknikov u liudei pri smennoi napriazhanno-emotsional'noi rabote). T. A. Belova and V. N. Vasil'ev (Akademiia Nauk SSSR, Laboratoriia Problem Upravleniia Funktsiiami v Organizme Cheloveka i Zhivotnykh, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Mar. 1974, p. 329-333. 28 refs. In Russian.

Study of the adrenal cortex function in human subjects under conditions of alternate shift work associated with mental and neuro-emotional stress. The excretion of urinary metabolites of 17-oxy and 17-desoxy corticosteroids measured by chromatography techniques was found to be in stress-exposed subjects twice as high as in the stress-spared control group. M.V.E.

A74-31086 # Contralateral spinal effects accompanying voluntary movements in the ankle joint of man (Kontralateral'nye spinal'nye efekty, soprovozhdaushchie proizvol'nye dvizheniia v golennostopnom sustave cheloveka). B. N. Smetanin (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Mar. 1974, p. 334-340. 21

refs. In Russian.

A74-31087 # Neurons of the medial preoptic area and septum reacting to temperature stimulation of the brain and skin (Neirony medial'noi preopticheskoi oblasti i peregorodki, reagiruiushchie na temperaturnye razdrazheniia mozga i kozhi). N. P. Zakharzhevskaya (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Mar. 1974, p. 341-348. 22 refs. In Russian.

A74-31088 # The mesaton test as a method for estimating the reactivity of the vegetative nervous system (Mezatonovaya proba kak metod otsenki reaktivnosti vegetativnoi nervnoi sistemy). G. N. Kassil', B. M. Gekht, and G. D. Khamidov (Akademiia Nauk SSSR, Laboratoriia Problem Upravleniia Funktsiiami Organizma Cheloveka i Zhivotnykh, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Mar. 1974, p. 349-357. 13 refs. In Russian.

Description of the procedure and results of a functional test using the sympathomimetic drug mesaton (meta-oxy-phenyl methylaminoethanol hydrochloride) for estimating the condition and reactivity of the sympathetic and parasympathetic portions of the vegetative nervous system in normal subjects and in patients with central and peripheral vegetative regulation disorders. The most obvious changes in reactivity were found in patients with hypothalamic lesions.

M.V.E.

A74-31089 # Amplitude-phase correlation of the inner-ear microphone potential (Sootnoshenie amplitudy i fazy mikrofonnogo potentsiala vnutrennego ukha). B. M. Sagalovich and V. B. Malinkin (Moskovskii Nauchno-Issledovatel'skii Institut Ukha, Gorka i Nosa, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Mar. 1974, p. 370-376. 14 refs. In Russian.

Review of the results of an investigation of the amplitude-phase correlation of the microphone potentials diverted from the round fenestra cochleae of rabbits over wide frequency and intensity ranges. It is shown that, at high signal intensities, changes in amplitude correlated with phase shifts.

M.V.E.

A74-31090 # Effect of the density of the inhaled gas on external respiration and reactivity of the respiratory center (Vliianie plotnosti vdykhaemogo gaza na vneshnee dykhanie i reaktivnost' dykhatel'nogo tsentra). G. V. Troshikhin (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Mar. 1974, p. 422-426. 21 refs. In Russian.

A74-31091 # Reaction to hypokinesia in rats following prior adaptation to hypoxia (Reaktsiia krysa na gipokineziyu posle predvaritel'noi adaptatsii k gipoksii). Z. I. Barbashova and O. I. Tarakanova (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Mar. 1974, p. 434-440. 11 refs. In Russian.

Demonstration of the protective effects of a prior one-month long adaptation to hypoxia in the reaction of rats to hypokinesia. The prophylactic effects of adaptation to hypoxia were observed in the lesser body weight losses and higher resistance of the whole organism than those in nonadapted rats.

M.V.E.

A74-31092 # Mechanism of transition from diaphragm-type to costal respiration (K mekhanizmu perekhoda diafragmal'nogo tipa dykhanii na rebrennyi). S. I. Frankshtein, L. N. Sergeeva, and E. S. Ivanova (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Mar. 1974, p. 441-444. 19 refs. In Russian.

Reviewed results of experiments with cats show that mechanical obstruction of the trachea leads to an immediate electric activity increase in both the diaphragmatic and intercostal muscles, which indicates that, first, the vagal lung reflexes are brought into action in the attempt to alleviate the mechanical difficulties of the respiratory function. A short time later, the relative activity increase of the thoracic muscles exceeds that of the diaphragm muscles.

M.V.E.

A74-31093 # Diurnal organization of the lipid metabolism in healthy man (Tsirkadnaia organizatsiia lipidnogo obmena u zdorovykh liudei). R. M. Zaslavskaya and K. Zh. Akhmetov (Aktiubinskii Meditsinskii Institut, Aktiubinsk, Kazakh SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Mar. 1974, p. 444-447. 6 refs. In Russian.

Reviewed investigation results show that the ratio of lecithin to cholesterol and the triglyceride content in the blood of healthy people are stable throughout the 24-hr day-night cycle, regardless of age. A regular diurnal fluctuation in the concentration of beta-lipoprotein and of general lipids has been found to take place in the blood of young healthy people. Also other findings are discussed.

M.V.E.

A74-31094 # Method for the dynamic analysis of oxygen oscillations in the human brain (Metod dinamicheskogo analiza kolebaniy napriazheniia kisloroda v golovnom mozge cheloveka). Iu. D. Kropotov (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Mar. 1974, p. 456-458. 6 refs. In Russian.

A74-31095 # A simple scheme for carrying out a controlled experiment with bioregulated feedback (Prostye skhemy dlia provedeniia upravliaemogo eksperimenta s bioreguliruemoi obratnoi svyaz'iu). Iu. A. Sidorov (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) and V. N. Efimov (Nauchno-Issledovatel'skii Institut Neirokibernetiki, Rostov, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Mar. 1974, p. 459-461. In Russian.

A74-31141 # Integral pressure converter for biomedical applications (Integral'nyi preobrazovatel' davleniia dlia biomeditsinskikh tselei). V. I. Vaganov, P. P. Polivanov, and K. M. Ponomarev. *Radioelektronika*, vol. 17, Mar. 1974, p. 107-109. In Russian.

A74-31231 * A wireless respiration failure detection system. J. M. Pope, J. Dimeff (NASA, Ames Research Center, Moffett Field, Calif.), and S. Abraham (Northern California, Children's Hospital Medical Center, Oakland, Calif.). *Medical and Biological Engineering*, vol. 12, May 1974, p. 348-354. 10 refs. Research supported by the Anita Oliver Lunn Foundation.

A74-31237 Exercise electrocardiography - Recognition of the ischemic response, false positive and negative patterns. A. A. Kattus (California, University, Los Angeles, Calif.). *American Journal of Cardiology*, vol. 33, May 20, 1974, p. 721-731. 13 refs. Research supported by the Reschke-Binnay Memorial Research Fund and Beaumont Foundation; Grants No. PHS-HE-08470; No. PHS-HE-11634.

The recognition of ischemic electrocardiographic responses, as they are elicited by exercise testing under controlled conditions, are discussed. The conclusions drawn are that: (1) the exercise electrocardiogram must be continuously monitored during testing since changes may be expected from moment to moment; and (2) good fidelity of recording must be assured by careful attention to electrode placement and fixation to avoid motion and positional artefacts.

M.V.E.

A74-31238 Disturbances of cardiac rhythm and conduction induced by exercise - Diagnostic, prognostic and therapeutic implications. A. N. DeMaria, Z. Vera, E. A. Amsterdam, D. T. Mason, and R. A. Massumi (California, University, Davis, Calif.). *American Journal of Cardiology*, vol. 33, May 20, 1974, p. 732-736. 27 refs. Grant No. NIH-HL-14780.

Survey of current knowledge of the electrophysiologic response of the heart to physical exertion, and review of research goals for future investigations. It is pointed out that exercise testing may have advantages over portable monitoring in the detection of ventricular arrhythmias.

M.V.E.

A74-31241 Echocardiography of the aortic valve. I - Studies of normal aortic valve, aortic stenosis, aortic regurgitation, and mixed aortic valve disease. O. Feizi (Royal Free Hospital, London, England), C. Symons (Middlesex Hospital, London, England), and M. Yacoub (Harefield Hospital, Middlesex, England). *British Heart Journal*, vol. 36, Apr. 1974, p. 341-351. 9 refs. Research supported by the Charles Wolfson Foundation.

A74-31242 Disparities in ventilatory and circulatory responses to bicycle and treadmill exercise. M. Niederberger, R. A. Bruce, F. Kusumi, and S. Whitkanack (Washington, University, Seattle, Wash.). *British Heart Journal*, vol. 36, Apr. 1974, p. 377-382. 18 refs. NIH-supported research.

The haemodynamic responses of patients with coronary heart disease to bicycle and treadmill exercise performed within one to two hours were compared. At the same percentages of the highest possible oxygen uptake on treadmill and bicycle, arterial mean pressure, heart rate, pressure-rate product, peripheral vascular resistance, and pulmonary ventilation were found to be higher during bicycle exercise. Cardiac output was the same, and stroke volume was lower on the bicycle. M.V.E.

A74-31248 Research in human engineering at the Royal Aircraft Establishment. R. G. Thorne (Royal Aircraft Establishment, Farnborough, Hants., England). *Aeronautical Journal*, vol. 78, Apr. 1974, p. 167-180. 21 refs.

A part of the research reported is concerned with the design of personal protective equipment. Anthropometric studies are discussed along with the advantages of liquid conditioned suits, the design of headgear providing impact and blast protection, the development of oxygen systems, and the provision of suitable seating arrangements. Investigations regarding environmental requirements are concerned with thermal problems, cabin noise, and vibration. Research in the field of ergonomics is also considered. G.R.

A74-31347 # Characteristics of transition processes associated with acute hypoxia effects in man (K kharakteristike perekhodnykh protsessov pri ostrom gipoksicheskom vozdeistvii u cheloveka). N. V. Lauer, M. M. Seredenko, and M. M. Koganovskaia (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Apr. 1974, p. 499-506. 9 refs. In Russian.

Study of the respiration, cardiovascular-system, and oxygen-transport dynamics in healthy human subjects during exposure to effects of acute hypoxia. The variations thereby generated are examined from the viewpoint of the organism's responses in terms of oxygen supply regulation. M.V.E.

A74-31348 # Morphofunctional rearrangement of muscle fibers as a result of cold adaptation and muscle loading (Morfofunktsional'naia perestroika myshechnykh volokon v rezul'tate adaptatsii k kholodu i myshechnoi nagruzke). V. I. Deribas and R. E. Filipchenko (Akademiia Nauk SSSR, Institut Tsitologii i Genetiki, Novosibirsk, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Apr. 1974, p. 566-575. 22 refs. In Russian.

A74-31349 # Effect of additional resistance to respiration on the ventilatory sensitivity to hypercapnia in man (Vlianie dobavoch'nogo soprotivleniia dykhaniiu na ventilatornuu chuvstvitel'nost' cheloveka k giperkapnii). R. I. Khvalibova (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Apr. 1974, p. 624-627. 13 refs. In Russian.

Determination of the ventilatory sensitivity to carbon dioxide in young, healthy, male subjects under ordinary conditions as well as under increased resistance to respiration. The inhibitory effect of increased resistance to respiration was found to vary as a function of ventilatory sensitivity to CO₂. M.V.E.

A74-31350 # Determination of maximum myocardium contraction rate in man (Opredelenie maksimal'noi skorosti sokrashcheniia miokarda u cheloveka). N. G. Gorbushin and Iu. N.

Konstantinov (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 60, Apr. 1974, p. 640-643. 25 refs. In Russian.

A procedure is presented for measuring the maximum myocardium contraction rate by means of an electrokymographic curve of the left ventricle of the heart with the aid of an equation describing myocardium behavior as the reaction of a dynamic system. The maximum myocardium contraction rate is shown to provide the means for a thorough exploration of the functional condition of separate heart regions. M.V.E.

A74-31393 Maximal oxygen uptake during arm cranking and combined arm plus leg exercise. N. H. Secher, N. Ruberg-Larsen, F. Bonde-Petersen (Copenhagen, University, Copenhagen, Denmark), and R. A. Binkhorst. *Journal of Applied Physiology*, vol. 36, May 1974, p. 515-518. 13 refs. Research supported by the Idaetens Forskningsrad and Statens Laegevidenskabelige Forskningsrad.

The sixteen subjects participating in the investigation included one swimmer, two canoeists, eight rowers, one track athlete, one bicyclist, and three students. It was found that the maximum oxygen uptake during combined arm exercise (A) plus leg exercise (L) can reach higher values than those observed during L alone. The data on blood lactic acid concentrations demonstrate that part of the increase in work power from L to A+L is due to an increased anaerobic metabolism. G.R.

A74-31394 Effects of metabolic hyperthermia on performance during heavy prolonged exercise. J. D. MacDougall, W. G. Reddan, C. R. Layton, and J. A. Dempsey (McMaster University, Hamilton, Ontario, Canada; Wisconsin, University, Madison, Wis.). *Journal of Applied Physiology*, vol. 36, May 1974, p. 538-544. 39 refs.

Observations were made on six subjects undergoing exhaustive treadmill running under differing thermal conditions. It was found that the addition of a hyperthermal condition significantly shortened the time that subjects were able to tolerate a constant heavy work load in comparison with the normal condition. Conversely, the addition of a hypothermal condition significantly increased work tolerance time over that of the normal condition. G.R.

A74-31395 * Measurement of continuous distributions of ventilation-perfusion ratios - Theory. P. D. Wagner, H. A. Saltzman, and J. B. West (California, University, La Jolla, Calif.). *Journal of Applied Physiology*, vol. 36, May 1974, p. 588-599. 34 refs. Grants No. PHS-HL-13687-02; No. PHS-HL-05931-02; No. NGL-05-009-109.

The resolution of the technique considered is sufficient to describe smooth distributions containing blood flow to unventilated regions (shunt), ventilation to unperfused regions (dead space), and up to three additional modes over the range of finite ventilation-perfusion ratios. In particular, areas whose ventilation-perfusion ratios are low can be separated from unventilated regions and those whose ventilation-perfusion ratios are high can similarly be distinguished from unperfused areas. G.R.

A74-31396 Semiautomated systems approach to the assessment of oxygen uptake during exercise. J. H. Wilmore (California, University, Davis, Calif.) and D. L. Costill (Ball State University, Muncie, Ind.). *Journal of Applied Physiology*, vol. 36, May 1974, p. 618-620. 10 refs.

A simple, versatile, and accurate system for the acquisition and reduction of respiratory and metabolic data during exercise testing has been described. Through the use of a new three-way respiratory gas sampling valve and a programmable calculator, it is possible to obtain values for pulmonary ventilation, oxygen consumption, and respiratory exchange ratio within 10 s of the end of the sampling period, providing the investigator with a data display which approximates real time analysis. (Author)

A74-31433 * Lens changes in the rabbit from fractionated X-ray and proton irradiations. S. F. Cleary, W. J. Geeraets, R. C. Williams, H. A. Mueller, and W. T. Ham, Jr. (Virginia Commonwealth University, Richmond, Va.). *Health Physics*, vol. 24, Mar. 1973, p. 269-276. 15 refs. Grant No. NGR-47-002-005.

A74-31444 # Study of some time-space properties of the alpha rhythm field (Issledovanie nekotorykh prostranstvenno-vremennykh svoystv polia al'fa-ritma). E. V. Tumskoj (Akademiia Nauk SSSR, Institut Evoliutsionnoi Morfologii i Ekologii Zivotnykh, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 215, Mar. 11, 1974, p. 494-496. 6 refs. In Russian.

Description of experiments in which an encephalograph with needle electrodes was used to measure the time-space characteristics of the alpha rhythm of the cerebral electric field in four subjects. Considerable variations of alpha rhythm were recorded in the same brain areas of different subjects and smaller variations were recorded in different brain areas of individual subjects. V.Z.

A74-31531 # Origin of collicular responses to optic tract stimulation (K proiskhozhdeniiu kollikuliarnykh otvetov, vozni-kaiushchikh na razdrazhenie zritel'nogo trakta). Z. S. Khanaeva (Akademiia Nauk Gruzinskoi SSR, Institut Fiziologii, Tiflis, Georgian SSR). *Akademiia Nauk Gruzinskoi SSR, Soobshcheniia*, vol. 73, Mar. 1974, p. 677-680. 7 refs. In Russian.

Responses in the anterior colliculus were evoked in lightly nembatalized and unanesthetized cats by administering an electrical shock to the ipsilateral optic tract. The responses could be divided into two parts: an early (0.4 to 0.7 msec latency) low-amplitude potential, followed by a high-amplitude potential (8 to 10 msec latency). The early response was detected at a much lower threshold than the later one. It is proposed that the two responses are each associated with a different group of optic tract fibers. P.T.H.

A74-31532 # Dynamics of the change in phase structure of the cardiac cycle during asphyxia (Dinamika izmeneniia fazovoi struktury serdechnogo tsikla pri asfiksii). L. A. Pochiani (Ministerstvo Zdravookhraneniia Gruzinskoi SSR, Institut Eksperimental'noi i Klinicheskoi Khirurgii, Tiflis, Georgian SSR). *Akademiia Nauk Gruzinskoi SSR, Soobshcheniia*, vol. 73, Mar. 1974, p. 737-740. 7 refs. In Russian.

The natural respiration of 30 rabbits was arrested. After 2 to 3 minutes of asphyxia, central parasympathetic control of cardiac activity broke down, while peripheral mechanisms, including efferent fiber endings and the effector system, continued to function. Left ventricular hypodynamia developed within 3 to 4 minutes after onset of asphyxia. P.T.H.

A74-31575 # Venous canal structure and character of inter-venous anastomoses in the heart of man (Do pobudovi venoznogo rusla i kharakteru mizhvenoznykh anastomoziv u sertsii liudini). A. I. Raikher (Ivano-Frankivs'kii Medichnii Institut, Ivano-Frankovsk, Ukrainian SSR). *Akademiia Nauk Ukrain's'koi RSR, Dopovidi, Seriya B - Geologiya, Geofizika, Khimiia i Biologiya*, vol. 36, Mar. 1974, p. 272-276. 17 refs. In Ukrainian.

The venous canal structure and capacity in the healthy human heart were investigated by using injection, stereorentgenography, macroscopy, and microscopy techniques in application to 30 total-heart and heart-slice preparations. The observed venous vessel formation characteristics, their directions in the myocardium, and the intervenous anastomoses are described. M.V.E.

A74-31622 # Electrophysiological data concerning the effect of sleep on the consolidation of excitation traces (Elektrofiziologicheskie dannye o vliianii sna na konsolidatsiiu sledov voz-buzhdeniia). L. G. Voronin, V. F. Kononov, and R. Ia. Senina (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino-Oka, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 215, Mar. 21, 1974, p. 751-754. 16 refs. In Russian.

Trace reactions after repeated sequences of 3-sec exposures to 50-Hz 0.3-J light pulses were studied in a group of 30 subjects

confined in a soundproof dark chamber with a facility for normal sleep. The subjects performed routine work producing various levels of stress over extended periods of time. They were instructed to estimate the time intervals of light signal sequences preceded or followed by periods of sleep and wakefulness. Galvanocutanograms, EEGs and EKGs were recorded during the experiments. The ability of trace reaction reproduction was generally lower after sleep than after wakefulness. V.Z.

A74-31624 Calculations on the optical modulation transfer function of the human eye for white light. A. van Meeteren (Nederlandse Centrale Organisatie TNO, Instituut voor Zintuigfysiologie, Soesterberg, Netherlands). *Optica Acta*, vol. 21, May 1974, p. 395-412. 43 refs.

Modulation transfer functions for the optics of the human eye are calculated, starting from available data on the various aberrations. These calculations provide a verification of recent measurements of the optical modulation transfer of the eye and reveal their relation to the aberrations concerned. The calculations were made for white light (equal energy distribution) weighted either by the photopic or the scotopic spectral sensitivity. F.R.L.

A74-31644 * Immediate effects of total visual deafferentation on single unit activity in the visual cortex of freely behaving cats. I - Tonic excitability changes. II - Rhythmic EEG bursts and PGO waves. T. Kasamatsu and W. R. Adey (California, University, Los Angeles, Calif.). *Experimental Brain Research*, vol. 20, May 17, 1974, p. 157-179. 37 refs. Contract No. F44620-70-C-0017; Grants No. NGR-05-007-195; No. PHS-5P01-NS-02501; No. NIH-RR-3.

A74-31649 # Systems analysis of integrative neuronal activity (Sistemnyi analiz integrativnoi deiatel'nosti neirona). P. K. Anokhin (I Moskovskii Meditsinskii Institut, Moscow, USSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 5, Apr.-June 1974, p. 5-92. 199 refs. In Russian.

The present work criticizes the generally prevalent conception of transmembranal potentials and electrical summation at the neuronal surface, used to explain neuronal activity. Instead, a new conception is introduced which can be termed 'inner neuronal processing and integration' of synaptic excitations. Those structural and biophysical properties of the neuron are thoroughly and critically examined which do not allow transmission of information without rough distortion. Structural, neurophysiological, and neurochemical proofs are given in favor of the concept of integrative neuronal activity. P.T.H.

A74-31650 # The biological and physiological mechanisms of oxygen supply to brain tissues (O biologicheskikh usloviakh i fiziologicheskikh mekhanizmach snabzheniia kislorodom tkanei golovnogo mozga). K. P. Ivanov (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 5, Apr.-June 1974, p. 128-144. 92 refs. In Russian.

A74-31675 Evoked potentials of the central visual system during and after hypoxia in cats. Y. Kayama (Yamaguchi University, Ube, Japan). *Electroencephalography and Clinical Neurophysiology*, vol. 36, June 1974, p. 619-628. 23 refs.

Noell and Chinn (1950) reported on hypoxic changes of evoked potentials in the central visual system recorded from the optic tract, the lateral geniculate body, and the visual cortex in response to flash stimulation of the eyes or electrical stimulation of the visual pathway. The experiment described was designed primarily in the same way as was Noell and Chinn's experiment. However, the present experiment was distinguished from the previous one in that as far as possible, recordings of the electrical activities were made simultaneously from different levels of the central visual system, and the configurations of the recorded evoked potentials were typical so as to allow identification of different components of the evoked potentials. Besides this, attempts were made to determine what electrographic signs were characteristic for a possible recovery from severe hypoxic deterioration. F.R.L.

A74-31789 Development of an air combat maneuver helmet system. W. H. Jagoe and W. Radzelovage. *SAFE Journal*, vol. 4, Spring 1974, p. 7, 22-24.

Recent experience in air warfare has shown that the weight of the helmet can be an important factor in reducing the effectiveness of pilots and missile officers under acceleration. It was, therefore, decided to optimize the tactical performance capabilities of fighter aircrews by developing an integrated helmet system. The design of the helmet shell is considered together with the means of communications to be provided and the oxygen system.

G.R.

A74-31792 Mathematical modeling and computer simulation of helmet dynamics and head response. J. K. Dienes (Systems, Science and Software, La Jolla, Calif.). *SAFE Journal*, vol. 4, Spring 1974, p. 11, 12, 27, 28. 27 refs.

A74-31794 The USAF Life Support System Program. M. E. Gonzales. *SAFE Journal*, vol. 4, Spring 1974, p. 14-17.

The USAF Life Support System is defined as an integrated assemblage of components, techniques, and training required to assure aircrews and their passengers the best possible flight environment for conducting various combat and peacetime Air Force missions. Beyond providing for maximum functional capability of flying personnel throughout all environments experienced during normal missions, it also affords the means for their safe and reliable escape, descent, survival, and recovery in emergency situations. The present work describes the organizations and control factors which were established to manage this system throughout its life cycle.

T.M.

STAR ENTRIES

N74-21700*# Techtran Corp., Glen Burnie, Md.
THE FUNCTION OF THERMOREGULATION IN PROTRACTED LIMITATION OF MOTOR ACTIVITY (HYPOKINESIA)

A. Ya. Tizul Washington NASA May 1974 9 p refs Transl. into ENGLISH from Zh. Nevropatol. Psikiatr. (Moscow), v. 73, no. 12, 1973 p 1791-1794
 (Contract NASw-2485)

(NASA-TT-F-15566) Avail: NTIS HC \$4.00 CSCL 06P

Thermotopography at 10 symmetrical points and the Shcherbak thermoregulation reflex in 10 normal individuals subjected to prolonged (120-day) clinostatic hypokinesia are used to demonstrate that thermoregulation function disturbances develop along with other hypokinetic disorders so early as the beginning of the 2nd month. Subjective temperature discomfort is accompanied by changes in the zonal interrelation of skin thermotopography, torpidity or reversal of thermoregulation mechanisms in response to application of local thermal loads. Thermoregulation function disturbances increase with advancing hypokinesia. Thermoregulation is restored about a month after transfer of the subject to a normal motor regime. Author

N74-21701*# Techtran Corp., Glen Burnie, Md.
METHOD FOR RAPID DETERMINATION OF TRANSPORT PARAMETERS OF CO₂ IN MAN USING THE CAPNOGRAPH AND MULTICHANNEL RESPIRATORY MASK

A. M. Shmeleva, I. S. Breslav, and B. N. Volkov Washington May 1974 10 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (Moscow), v. 59, no. 7, Jul. 1973 p 1139-1143
 (Contract NASw-2485)

(NASA-TT-F-15443) Avail: NTIS HC \$4.00 CSCL 06P

Use of the capnograph and a special breathing mask is described in conjunction with the determination of the CO₂ transport parameters in human subjects. This method is preferable to those previously employed inasmuch as it requires no puncture of the subject's circulatory system. Author

N74-21702*# Techtran Corp., Glen Burnie, Md.
THE MINUTE VOLUME OF THE HEART IN VARIOUS TYPES OF BATH

Chr. Kroetz and R. Wachter Washington NASA Apr. 1974 11 p refs Transl. into ENGLISH from Klin. Wochschr. (Berlin), v. 12, 1933 p 1517-1520
 (Contract NASw-2485)

(NASA-TT-F-15438) Avail: NTIS HC \$4.00 CSCL 06P

Human heart minute volumes were determined under the following balneological conditions: neutral lukewarm water, oxygen, carbon dioxide brine, carbon dioxide gas, and air baths. Results show that the CO₂ brine bath produced a maximum respiratory quotient and the strongest skin reactions. The minute volume increased also distinctly in the fresh water bath but not by any great amount. G.G.

N74-21703*# Techtran Corp., Glen Burnie, Md.
MORPHOLOGICAL AND BIOCHEMICAL CHANGES IN RABBITS SUBJECTED TO CONSIDERABLE LIMITATION OF MOBILITY

A. M. Vikhert, V. I. Metelitsa, V. D. Baranova, and I. Ye. Galakhov Washington NASA May 1974 9 p refs Transl. into ENGLISH from Kardiologiya (Moscow), v. 12, Sep. 1972 p 143-146
 (Contract NASw-2485)

(NASA-TT-F-15427) Avail: NTIS HC \$4.00 CSCL 06C

Prolonged inhibition of mobility in rabbits has been found to result in focal medionecrosis with subsequent mediocalcinosis. Author

N74-21704*# Kanner (Leo) Associates, Redwood City, Calif.
CARDIAC DECONDITIONING DURING PROLONGED HYPODYNAMIA

I. G. Krasnykh Washington NASA Apr. 1974 6 p Transl. into ENGLISH from Voenna-Med. Zh. (Moscow), no. 2, Dec. 1973 p 54-56
 (Contract NASw-2481)

(NASA-TT-F-15528) Avail: NTIS HC \$4.00 CSCL 06S

The influence of 30-day hypodynamia on heart size, stroke volume and myocardial contractility was studied on 20 male volunteers divided into 3 groups. Members of the first group stayed in bed during the whole experiment, the men of the second group were free to move in a small chamber, and members of the third group stayed in bed and performed daily intensified physical exercises. Teleroentgenokymograms were used to determine heart size (systolic and diastolic) and stroke volume. By the end of the experiment, the heart size of the men in the first group was reduced by about 20% and stayed at this level during the next month; the men also complained of dyspnea and tachycardia during physical loading. A similar reduction (about 10%) was experienced by the test subjects of the second group, while in the third group these changes were insignificant. Complete restoration of heart size and stroke volume required 60 days. Daily exercises (the third group) almost fully prevented the development of cardiac deconditioning. Author

N74-21705*# Kanner (Leo) Associates, Redwood City, Calif.
THE DANGERS OF STAYING IN BED (THE DELETERIOUS EFFECTS OF BED REST)

L. E. Boettlinger Washington NASA Apr. 1974 6 p Transl. into ENGLISH from Nord. Med. (Stockholm), v. 75, no. 7, 1966 p 188-189
 (Contract NASw-2481)

(NASA-TT-F-15561) Avail: NTIS HC \$4.00 CSCL 06S

The literature on the deleterious effects of bed rest is reviewed. Strict bed rest produced in humans marked orthostatic hypertension, a reduced capacity on the stationary bicycle ergometer, and an increased calcium secretion. The first two changes were improved or reduced by allowing the patients to exercise or to sit up; the third, only by having them maintain an upright position for at least 3 hours per day. Author

N74-21706*# Techtran Corp., Glen Burnie, Md.
A NEW METHOD OF EVALUATING RHOENCEPHALOGRAMS AND ITS APPLICATION IN THE STUDY OF VERTIGO

A. Ye. Kurashvili and O. Ya. Plepis Washington NASA Apr. 1974 10 p refs Transl. into ENGLISH from Ushnykh Nosovykh Gorlovykh Bolez (Ukrainian SSR), v. 32, Sep. - Oct. 1972 p 49-52
 (Contract NASw-2485)

(NASA-TT-F-15458) Avail: NTIS HC \$4.00 CSCL 06E

Eighty seven healthy individuals were examined to determine their tolerance of cumulative conchis acceleration. Forty-eight persons tolerated it well; the other 39 showed symptoms of vertigo at different times after commencement of stimulation. The rhoencephalograms obtained in the study were processed mathematically. Analysis of the most informative parameters of the 11 coefficients of expansion of the REG curves in the Fourier series by the computer yielded the integral parameter of vestibular apparatus stability. Considerable difference was noted in cerebral blood circulation between those subject to vertigo and those who are not; this difference appearing at the very outset of conchis acceleration application, i.e., even before vertigo symptoms were exhibited. Author

N74-21707* Kanner (Leo) Associates, Redwood City, Calif.
**CHANGES IN CEREBRAL CIRCULATION INDUCED BY
 HYPNOTIZATION OF THE RABBIT BY THE IMMOBILIZA-
 TION METHOD**

I. T. Demchenko and P. I. Paykin Washington NASA Apr. 1974 14 p refs Transl. into ENGLISH from Zh. Vysshei Nervnoi Deyatel'nosti (Moscow), v. 21, no. 5, Sep. 1971 p 1006-1011

(Contract NASw-2481)

(NASA-TT-F-15520) Avail: NTIS HC \$4.00 CSCL 06C

Fifteen rabbits were hypnotized by fixing them in position on the stomach for 1 min. Electrodes for recording electroplethysmograms and EEG and for polarographic determination of oxygen pressure, and MT-54 thermistors were inserted stereotactically into the sensorimotor cerebral cortex, the dorsal hippocampus, and the reticular formations of the tectum and pons. Arterial pressure was recorded through a catheter inserted into the femoral artery. It was demonstrated that the state of catalepsy in rabbits is accompanied by a sharp enhancement in brain vessel tonus and a decrease in blood flow to all structures investigated. Decrease in brain vessel tone during hypnosis induces the animal to wake up, while an enhanced tone leads to prolongation of hypnosis.

Author

N74-21708* Techtran Corp., Glen Burnie, Md.

BIONICS: THEORETICAL AND PRACTICAL PROBLEMS
 U. Sh. Akhmerov Washington NASA May 1974 11 p Transl. into ENGLISH from Vestn. Vysshey Shkoly (USSR), no. 10, Oct. 1973 p 41-45

(Contract NASw-2485)

(NASA-TT-F-15508) Avail: NTIS HC \$4.00 CSCL 06D

The history of the Bionics Laboratory of Kazan' University Physics Faculty is briefly outlined. An account is given of the organization of the Laboratory, past accomplishments of the Laboratory are reviewed, and current and future problems of its activity are considered.

Author

N74-21709* Techtran Corp., Glen Burnie, Md.

**PARTICIPATION OF THYROID GLAND HORMONES IN THE
 MECHANISM OF DEVELOPMENT OF TROPHIC DISTURB-
 ANCES OF THE GASTRIC MUCOSA IN RATS RESULTING
 FROM THEIR PROLONGED IMMOBILIZATION**

P. P. Denisenko and A. N. Poskalenko Washington NASA May 1974 8 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), v. 11, Jun. - Aug. 1967 p 30-32

(Contract NASw-2485)

(NASA-TT-F-15510) Avail: NTIS HC \$4.00 CSCL 06P

Oral administration of thyroindin doubled the number and severity of dystrophic disturbances in the gastric wall occurring on prolonged immobilization of rats. Disturbances of the trophic system of the gastric mucosa due to immobilization were much less pronounced in thyroidectomized animals than in control rats, and one fifth as marked as in animals treated with thyroindin. Hexonium and metamylic, a central cholinolytic, also reduced the intensity of dystrophic disturbances by one-half or even more.

Author

N74-21710* California Inst of Tech., Pasadena. Div. of Biology.

[PHYSIOLOGY OF APLYSIA CALIFORNICA] Final Technical Report, Jul. 1969 - Jun. 1973

Felix Strumwasser 2 Nov. 1973 11 p refs

(Grant NGR-05-002-031)

(NASA-CR-138149) Avail: NTIS HC \$4.00 CSCL 06C

Summaries of research papers on the Aplysia Californica are presented. Thirty three works are cited. Emphasis is on the nervous system organization of this animal.

S.K.W.

N74-21711* Kanner (Leo) Associates, Redwood City, Calif.
COMPUTER DIAGNOSIS

L. Kruglov Washington NASA Apr. 1974 8 p Transl. into ENGLISH from Setskaya Zhizn Newspaper (USSR), 3 Nov. 1973 4 p

(Contract NASw-2481)

(NASA-TT-F-15529) Avail: NTIS HC \$4.00 CSCL 06E

An E-220 computer capable of 30 thousand operations per second was used to diagnose various diseases and defects. Specifically, the computer is programmed to diagnose 66 kinds of heart defects, various internal diseases, jaundice, rheumatism, acute peritonitis, and many other ailments. Doctors, clinics, and hospitals outside the immediate area may use the system through a teletype network.

Author

N74-21712* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**CIRCADIAN, ENDOCRINE, AND METABOLIC EFFECTS OF
 PROLONGED BEDREST: TWO 56-DAY BEDREST STUD-
 IES**

Joan Vernikos-Danellis, Charles M. Winger, Carolyn S. Leach, and Paul C. Rambaut Washington Apr. 1974 47 p refs

(NASA-TM-X-3051; A-5339) Avail: NTIS HC \$3.25 CSCL 06P

Two bedrest studies of 56 days each have been conducted to evaluate the effects of prolonged bedrest on circadian synchrony and endocrine and metabolic function. Measurements included the pituitary-adrenal, thyroid, parathyroid, insulin-glucose-growth hormones, catecholamine excretion, body temperature, and heart rate. The results indicated that a rigorous regimen of exercise did not prevent the endocrine and metabolic effects of prolonged bedrest. Changes in circadian, endocrine, and metabolic functions in bedrest appear to be due to changes in hydrostatic pressure and lack of postural cues rather than to inactivity, confinement, or the bleeding schedule. Prolonged bedrest, particularly beyond 24 days, resulted in rhythm desynchronization in spite of well regulated light/dark cycles, temperature, humidity, activity, and meal times and meal composition and in increased lability of all endocrine parameter measured. It also resulted in an apparent insensitivity of the glucose response to insulin, of cortisol secretion to ACTH, and of growth hormone secretion to hypoglycemia.

Author

N74-21713* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**QUANTITATIVE VALUES OF BLOOD FLOW THROUGH THE
 HUMAN FOREARM, HAND, AND FINGER AS FUNCTIONS
 OF TEMPERATURE**

Leslie D. Montgomery Mar. 1974 88 p refs

(NASA-TM-X-62342) Avail: NTIS HC \$7.50 CSCL 06P

A literature search was made to obtain values of human forearm, hand and finger blood flow as functions of environmental temperature. The sources used include both government and laboratory reports and the research presented in the open literature. An attempt was made to review many of the more quantitative noninvasive determinations and to collate the results in such a way as to yield blood flow values for each body segment as continuous functions of temperature. A brief review of the various ways used to measure blood flow is included along with an abstract of each work from which data was taken.

Author

N74-21714* Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.

**ENERGETIC ADVANTAGES OF BURST SWIMMING OF
 FISH**

D. Weihs Dec. 1973 28 p refs

(TAE-189) Avail: NTIS HC \$4.50

It is shown theoretically that fish can swim more efficiently by alternating periods of accelerated motion and powerless gliding. Analysis of the mechanics of swimming shows that large savings of over 50% in the energy required to traverse a given distance can be obtained by such means. In calculations based upon measured data for Salmon and Haddock, the possibility of range increases of up to 3 times the range at constant speed are demonstrated.

Author

N74-21715* Kanner (Leo) Associates, Redwood City, Calif.
**COMPARATIVE STUDY OF THE EFFECTS OF SALTS ON
 FOUR ENZYMES FROM THE EXTREME HALOPHILE
 BACTERIA OF HALOBACTERIUM CUTIRUBRUM**

A. I. Higa, M. C. Vidal, and J. J. Cazzulo Washington NASA

May 1974 16 p refs Transl. into ENGLISH from *Anales Asoc. Quim. (Argentina)*, v. 61, 1973 p 291-300 (Contract NASw-2481) (NASA-TT-F-15560) Avail: NTIS HC \$4.00 CSCL 06M

The effects of monovalent and bivalent cations, as chlorides, on three dehydrogenases and one synthetase partially purified from *H. cutirubrum* were studied. All monovalent cations tested were effective, with the exception of TRIS for glycerol dehydrogenase. The effectiveness of the same cations differed for the different enzymes. All enzymes were activated by low concentrations of Ca^{++} or Mg^{++} . The enzymes were rapidly inactivated when incubated at 30 deg with low salt concentration; they were protected with varying effectiveness by the same salts tested as activators. The order of effectiveness of the anions Cl^- , Br^- , NO_3^- and SCN^- , as K^+ salts, as activators of the enzymes studied followed their effectiveness in salting out. Author

N74-21716*# Techtran Corp., Glen Burnie, Md.
POSITIVE HABITUATION AND VESTIBULAR RECRUITMENT

M. Emami-Nouri Washington NASA May 1974 12 p refs Transl. into ENGLISH from *Acta Oto-Laryngol. (West Ger.)*, v. 76, 1973 p 183-189 (Contract NASw-2485) (NASA-TT-F-15509) Avail: NTIS HC \$4.00 CSCL 06P

Adaptation and sensory stimulation as it applied to the vestibular apparatus are discussed. Multiple rotatory, thermal, galvanic and pendular stimuli do not result in habituation. The peripheral vestibular receptor always reacts in the same manner following repeated stimuli. Adaptation is a central process, which occurs in nervous and central lesions. Author

N74-21717*# Scripta Technica, Inc., Washington, D.C.
STUDIES IN GEOMAGNETISM, AERONOMY AND SOLAR PHYSICS (PROBLEMS OF HELIOBIOLOGY AND THE BIOLOGICAL EFFECT OF MAGNETIC FIELDS) NO. 17

A. T. Platonova, ed. Washington NASA Jan. 1974 198 p refs Transl. into ENGLISH of the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley). Vypusk 17" Moscow, Nauka Press, 1971 p 1-174 (Contract NASw-2484) (NASA-TT-F-815) Avail: NTIS HC \$5.50 CSCL 06C

Statistical analysis reveals correlations between changes in solar activity and the intensity of various biological processes. The biological activity of magnetic fields is proved, and research approaches to these problems are outlined. Author

N74-21718# Advisory Group for Aerospace Research and Development, Paris (France).
MAN AT HIGH SUSTAINED +Gz ACCELERATION

R. R. Burton (School of Aerospace Med.), S. D. Leverett, Jr. (School of Aerospace Med.), and E. D. Michaelson (Mt. Sinai Hosp.) Mar. 1974 31 p refs (AGARD-AG-190: AGARDograph-190) Avail: NTIS HC \$4.75 CSCL 06P

Man has tolerated +9Gz for 45 sec and +8Gz for 60 seconds. Physiological changes and tolerance limits in a sustained high acceleration environment are expressed by: (1) high heart rate; (2) reduction in SaO_2 ; (3) cardiac arrhythmia; and (4) subject fatigue. The effects of HSG are marked in terms of gas exchange and arterial hypoxia. Fatigue appears to be the critical factor regarding human limitations to HSG, and arterial desaturation appears to be the limiting factor in subjects using a reclining seat to prevent fatigue. Author

N74-21719*# Naval Biomedical Research Lab., Oakland, Calif.
EVIDENCE FOR METABOLIC ACTIVITY OF AIRBORNE BACTERIA Quarterly Status Report

M. A. Chatigny and H. Wolochow 1 Feb. 1974 16 p refs (NASA Order W-13450) (NASA-CR-138187: QSR-4) Avail: NTIS HC \$4.00 CSCL 06M

Aerosols of the bacterium *Serratia marcescens*, and of

uniformly labeled C-14 glucose were produced simultaneously and mixed in tubing leading to an aerosol chamber. During a subsequent period of about 5 hrs. carbon dioxide was produced metabolically within the chamber, and labeled material incorporated within the suspended particles first increased then decreased. This constitutes the first direct evidence of microbial metabolism of bacteria suspended in the air. Author

N74-21720# Atomic Energy of Canada Ltd., Chalk River (Ontario).
BIOLOGY AND HEALTH PHYSICS DIVISION Progress Report, 1 Apr. - 30 Jun. 1973

Aug. 1973 71 p refs (AECL-4610) Avail: NTIS Avail: AEC Depository Libraries HC \$5.75; Atomic Energy of Can. Ltd., Chalk River \$1.50

Research progress is reported for the Biology and Health Physics Division of the Chalk River Nuclear Laboratories. Activities in the biology, population research, environmental research, and health physics branches are summarized. NSA

N74-21721# European Space Research Organization, Paris (France).
EFFECTS OF TIME SHIFT ON THE DIURNAL EXCRETION PATTERN OF 17-HYDROXYCORTICOSTEROIDS

U. Dierlich (DFVLR, Bonn) Mar. 1974 65 p refs Transl. into ENGLISH of *Auswirkungen der Zeitverschiebung auf die Tagesrhythmik der 17-Hydroxycorticosteroide*, DLR-FB-73-58, DFVLR, 20 Mar. 1973 (ESRO-TT-34: DLR-FB-73-58) Avail: NTIS HC \$6.25; Original report in GERMAN: DFVLR, Porz, West Ger. 20.60 DM

The urinary excretion of conjugated and unconjugated 17-Hydroxycorticosteroids (17-OHCS) was studied in 8 male students in 3-hour intervals during periods of 24 hours. Two 24-hour pre-flight periods revealed the basic normal daily periodicity of 17-OHCS excretion. Effects of a 6-hour time shift were evaluated by determining the excretion rates after flights from Germany to the U.S.A. and vice versa on day 1, 3, 5 and 8 after arrival. A desynchronization with the new local time was observed after flights in both directions, the diurnal 17-OHCS excretion patterns being more disturbed, however, after the West-East flight. The resynchronization time of maximum and minimum excretion was 3-5 days after the westward travel and 5-8 or more after travelling in the opposite direction. It is suggested that the unfavorable flight conditions of the West-East flight (night flight) mainly account for the more marked time shift effects observed after the eastward flight. Author (ESRO)

N74-21722# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
POSSIBLE WAYS OF ESTABLISHING PERMISSIBLE RADIATION DOSES DURING PROLONGED SPACE FLIGHTS

Yu. G. Grigorev 17 Dec. 1973 11 p Transl. into ENGLISH from the book "Somaticheskie Effekty Khronicheskogo Oblucheniya, Tezisy Dokl. na Vsesoyuznom Simpoziume: Khronicheskoe Deistvie Vneshnego Gamma-Oblucheniya na Organizm Sobak" Moscow, 16-20 Oct. 1972 p 3-6 and 9-10 (AD-773288: FTD-HT-23-648-74) Avail: NTIS CSCL 06/18

When establishing the permissible levels of radiation during prolonged space flights one should consider not only the absolute risk attributed to radiation, but also the relative risk. The latter is determined by the ratio of frequencies of the consequences due to radiation to the analogous consequences due to other factors of the external medium. The solution of the problem of risk when estimating the danger of possible radiation effects under the conditions of a prolonged flight consists of finding an optimum relationship between the known radiation danger and the advantages of the mastery of space for man. GRA

N74-21723# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
IN THE ARMCHAIR OF THE TESTER

M. Kashevnik and O. Losoto 17 Dec. 1973 10 p Transl. into ENGLISH from *Leninskoe Znamya (USSR)*, no. 179, 2 Aug. 1973 p 2

(AD-773289; FTD-HT-23-734-74) Avail: NTIS CSCL 06/5
Training programs for cosmonauts in the U.S.S.R. are described. GRA

N74-21724# School of Aerospace Medicine, Brooks AFB, Tex.
THE INFLUENCE OF 3,5-DIETHYLHYDANTOIN UPON SURVIVAL DURING ACUTE AND CHRONIC HYPOXIA Final Report, Aug. - Nov. 1972

William E. Pepelko, Robert G. Streeter, John M. Swann, and Gene A. Dixon Dec. 1973 13 p refs
(AF Proj. 7164)

(AD-772695; SAM-TR-73-38) Avail: NTIS CSCL 06/15

The median survival times of rats decompressed within five minutes to a barometric pressure of 160 mm Hg (33.5 mm Hg PO₂) were significantly increased (P less than .05 and P less than .02) in two groups of 15 rats each pretreated with 150 mg/kg body wt 3,5-diethylhydantoin (DH); rats pretreated with 50 mg/kg of the drug did not differ from controls. Maximum swimming times of 15 rats exposed to a PO₂ of 77 mm Hg and a water temperature of 35C tended to be longer following pretreatment with 50 mg/kg DH (P less than .10). Sixteen of 20 saline-injected controls survived 11 days of continuous exposure to a PO₂ ranging from 37 to 49 mm Hg, compared with 10 of 20 animals treated daily with 50 mg/kg and 7 of 20 treated with 150 mg/kg DH. The drug-treated animals showed more abnormal pathology than controls. It was concluded that although DH treatment may result in an increase in survival time during acute hypoxia, its apparent toxicity with repeated use in a hypoxic environment precludes its consideration in U.S. Air Force operations. (Modified author abstract) GRA

N74-21725# Florida Univ., Gainesville. Dept. of Materials Science and Engineering.

AN INVESTIGATION OF BONDING MECHANISMS AT THE INTERFACE OF A PROSTHETIC MATERIAL Annual Report, 1 Sep. 1972 - 31 Aug. 1973

Larry L. Hench, William C. Allen, Homer A. Paschall, and George Piotrowski Sep. 1973 129 p refs
(Contract DADA17-70-C-0001)

(AD-772668; Rept. 4; AR-4) Avail: NTIS CSCL 06/12

Specially designed glasses and glass-ceramic implants containing Na, Ca, P, and Si ions develop a bond between the material and living bone. The formation of the interfacial bond involves the development of a SiO₂ gel by loss of Na(+) ions from the surface into the extracellular fluids. Bone growing cells create collagen fibers which become entrapped in the SiO₂-rich gel in 3-4 weeks. In 4-6 weeks Ca, P migration through the surface gel produces large hydroxyapatite-like crystals which interlock with naturally mineralizing bone forming a stable bond. This interfacial bonding mechanism is established using: transmission electron microscopy, ion-milling Auger spectroscopy, SEM with X-ray analysis, ion solution analysis, and various polypeptide adsorption studies. Techniques and computer programs for the calculation of stress in arbitrary multiply-connected cross sections have been developed and are being applied to the mechanical data obtained from the monkey experiments. Preliminary data on the variability of paired bones for biomechanical studies have been statistically evaluated and presented. (Modified author abstract) GRA

N74-21726# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

A COMPARISON OF JUDGEMENTS OF VIBRATION INTENSITY FOR CHEST-TO-BACK (X AXIS) AND SIDE-TO-SIDE (Y AXIS) EXPOSURES Final Report

Richard W. Shoenberger Nov. 1973 12 p refs
(AF Proj. 7231)

(AD-773818; AMRL-TR-73-32) Avail: NTIS CSCL 06/1

The subjective intensity of vibration in the two primary horizontal axes (X axis, chest-to-back; and Y axis, side-to-side) was compared through an intensity matching procedure. Unrestrained seated subjects matched their judgements of vibration intensity in one axis (X or Y) by adjusting the intensity of vibration in the other axis until it was subjectively equal to the first. Each of eight subjects made a series of intensity

judgments which were counterbalanced so that half of the matches were with an X-axis stimulus and a Y-axis response, and the other half were with a Y-axis stimulus and an X-axis response. Vibration was sinusoidal at 5, 7, 10, 15, 20, and 30 Hz. Peak accelerations at each frequency ranged from a lower limit of 0.1g to upper limits of 0.5 to 1.3g (depending on frequency). Each vibration stimulus had a duration of 20 seconds. Results showed that, within the limits of the vibration parameters sampled, X-axis vibration was judged to be slightly but consistently more intense than Y-axis vibration. (Modified author abstract) GRA

N74-21727# Tulane Univ., New Orleans, La. Biomechanics Lab.

A DISTRIBUTED PARAMETER MODEL OF THE INERTIALLY LOADED HUMAN SPINE: A FINITE DIFFERENCE SOLUTION Final Report, 1 Dec. 1971 - 1 Apr. 1973

Y. King Liu, Harold J. Cramer, and Dale U. VonRosenberg Nov. 1973 147 p refs

(Contract F33615-72-C-1212; AF Proj. 7231)

(AD-773859; AMRL-TR-73-65) Avail: NTIS CSCL 06/19

The purpose of this research was the development and solutions of nonlinear continuum models of the human spinal response to impact, with emphasis on the vertical impact-pilot ejection problem. A derivation is given for a general one-dimensional continuum model of the spine considered as a curved homogenous beam and subject to the eccentric inertial loading of the human torso. A reduction to a small strain, large deflection model is made by introducing the assumptions of linear elasticity. A further reduction to a small strain, small deflection model is made by assuming small curvatures. A three parameter viscoelastic model is also treated. Methods of solution for these nonlinear dynamic models are formulated using the finite difference calculus. (Modified author abstract) GRA

N74-21728# Colorado State Univ., Fort Collins. Dept. of Fishery and Wildlife Biology.

EFFECTS OF SILVER FROM CLOUD SEEDING ON MICROFLORA OF ANIMAL DIGESTIVE SYSTEMS Final Report

James A. Bailey, Allen M. Jones, and Donald R. Roy Sep. 1973 39 p refs

(Contract DI-14-06-D-7208)

(PB-226062/8GA) Avail: NTIS HC \$4.00 CSCL 06F

Hazards of silver from weather modification to microorganisms of the rabbit cecum and goat rumen were evaluated. Rabbits eliminated 99 percent of an oral dose of silver iodide within three days and essentially all of the dose in an average of 6.3 days. Only 8-26 percent of the silver entered the cecum. Digestion of a ration containing 4.2 ppm silver as silver iodide and of a ration containing 10 ppm silver as silver nitrate was not affected by the metal. Results demonstrate that silver compounds in areas of weather modification are very unlikely to inhibit microorganisms of the digestive tracts of livestock or wildlife. GRA

N74-21729# Tulane Univ., New Orleans, La. Biomechanics Lab.

A FINITE ELEMENT ANALYSIS OF WAVE PROPAGATION IN HUMAN SPINE Final Report, 1 Dec. 1971 - 30 Apr. 1973

Y. King Liu and Gautam Ray Nov. 1973 89 p refs

(Contract F33615-72-C-1212; AF Proj. 7231)

(AD-773858; AMRL-TR-73-40) Avail: NTIS CSCL 06/19

A finite element model for the dynamic configuration and force responses of the initially curved human spine has been developed in the first part of this report. The layered media column with alternate discs and vertebrae, variable lengths and cross-sectional areas along the spine has been accounted for. Application of a +Gz impulsive loading results in the simultaneous propagation of the axial, bending and shear deformations in this initially curved, inhomogeneous beam-column. The effects of rotatory inertia has also been included. The model takes into account two distinctly different wave speeds - a faster one for axial and bending deformations and a slower one for the shear deformation. The second part is a scheme for the stress analysis of a typical disc-vertebra interface for a given dynamic moment, shear and axial force. (Modified author abstract) GRA

N74-21730# School of Aerospace Medicine, Brooks AFB, Tex.
**RECENT ADVANCES IN OPERATIONAL AEROSPACE
 MEDICINE Aeromedical Review**

Royce Moser, Jr. Jan. 1974 24 p refs
 (AD-774118; SAM-Review-1-74; SAM-TR-74-3) Avail: NTIS
 CSCL 06/5

The review provides Air Force flight surgeons information regarding recent advances in operational aerospace medicine. Material was selected for inclusion which deals with the more common problems confronting practicing flight surgeons. The review discusses advances in the administrative, clinical, research, environmental health, and education areas of aerospace medicine. It represents one aspect of continuing education in aerospace medicine for the flight surgeon. Author (GRA)

N74-21731 Centre Chirurgial Marie-Lannelongue, Paris (France).
 Lab. de Physiopathologie et Inst. Bolivien de Biologie d'Altitude.
**ENERGY BALANCE DURING THE MUSCULAR EXERCISE
 IN MAN Final Report**

Jeanne Raynaud Dec. 1972 29 p refs In FRENCH; ENGLISH
 summary
 (Contract DGRST-69-0-1285)
 Avail: Issuing Activity

At the onset of exercise, O₂ flow returning to the lungs from the periphery transiently exceeds rest and steady state exercise values. This shows a delayed utilization of O₂. At a given mechanical power, the relative part played by creatine phosphate is identical at sea level and high altitude, but anaerobic glycolysis is more important. The anaerobic threshold occurs at a lower mechanical power at high altitude. Maximum blood concentration of the growth hormone is closely related to the initial O₂ deficit. Thermoregulatory reactions are as effective at high altitude as at sea level; however, sweating rate is higher in spite of a decrease of cutaneous blood flow. Author (ESRO)

N74-21732*# Rancho Los Amigos Hospital, Inc., Downey,
 Calif.

**DEVELOPMENT OF AN EXTERNALLY POWERED PROSTHE-
 TIC HOOK FOR AMPUTEES Final Project Report, 27 Mar.
 1971 - 30 Apr. 1973**

Andrew Karchak, Jr., James R. Allen, and Ernest L. Bontrager
 30 Apr. 1973 63 p refs
 (Contract NAS8-27020)

(NASA-CR-120213) Avail: NTIS HC \$6.25 CSCL 06E

The powered hook with trigger finger appears to be a useful adaptation of a terminal device for an amputee when performing vocational activities involving the use of a powered tool requiring a trigger control. The proportional control system includes transducers and amplifiers and appears to have widespread application for control of any external power, whether it be in the orthotic or prosthetic field. Author

N74-21733# Max-Planck-Institut fuer Stroemungsforschung,
 Goettingen (West Germany).

**[ON WASTE PRODUCT LOADING OF WATERS AND WASTE
 WATER PURIFICATION] [ZUR ABFALLSTOFFBELASTUNG
 VON GEWAESSERTEN UND ZUR ABWASSERREINIGUNG]**

Peter E. M. Schneider Jan. 1974 53 p refs In GERMAN
 (Ber-2-1974) Avail: NTIS HC \$5.75

A literature survey is presented on problems of water pollution and self reclamation methods. It is shown that current flow plays an important role in the turbulent transfer of surface oxygen into deeper water layers and thus to natural waste conversion by living organisms. The amount of oxygen available to living organisms in deep water is strictly dependent on current patterns. Transl. by G.G.

N74-21734*# Scientific Translation Service, Santa Barbara,
 Calif.

WALKING IN OPEN SPACE

G. Titov Washington NASA Apr. 1974 10 p Transl. into
 ENGLISH from Aviat. Kosmonavt. (Moscow), no. 1, Jan. 1974
 p 34-35

(Contract NASw-2483)

(NASA-TT-F-15526) Avail: NTIS HC \$4.00 CSCL 05E

A description is given of the operations involved when walking

in space. These include assembly, maintenance and repair of different spacecraft equipment, changing crews of orbital stations, rescuing cosmonauts and spacecraft, and others. Author

N74-21735*# Kanner (Leo) Associates, Redwood City, Calif.
ERGONOMICS: A NEW SCIENCE FOR MAN

L. Chaynova Washington NASA Apr. 1974 7 p Transl. into
 ENGLISH from Tekhn. Molodezhi (Moscow), no. 12, Dec. 1973
 p 18-19

(Contract NASw-2481)

(NASA-TT-F-15527) Avail: NTIS HC \$4.00 CSCL 05E

The human operator's functions are analyzed in order to design machinery and plan for its efficient use. Electroencephalographs, electromyographs, electrocardiographs, electrooculographs, and an apparatus for measuring galvanic reactions of the skin are used to measure the operator's activity as he works at a stand simulating a machine. Data collected by computer are then used in the design of the actual machine. For example, a section of a chemical plant is reorganized by analyzing the existing situation and altering it accordingly. Subsequent results showed that improved man machine interfaces can drastically increase output. Author

N74-21736*# Virginia Univ., Charlottesville. Research Labs.
 for the Engineering Sciences.

**ENVIRONMENTAL CRITERIA FOR HUMAN COMFORT. A
 STUDY OF THE RELATED LITERATURE Final Report**

Ira D. Jacobson Feb. 1974 113 p refs

(Grant NGL-47-005-151)

(NASA-CR-138144; BE-4088-101-74) Avail: NTIS HC \$8.75
 CSCL 05E

The data presented has for the most part been extracted from existing in-house and memoranda reports. The variables considered are motion, noise, temperature and pressure. The report is broken down into chapters for each of the environmental variables and criteria proposed based on the existing literature. Author

N74-21737*# Scientific Translation Service, Santa Barbara,
 Calif.

FLIGHT DICTATES TRAINING

R. Makarov Washington NASA Apr. 1974 10 p Transl.
 into ENGLISH from Aviat. Kosmonavt. (USSR), no. 2, 1974
 p 44-45

(Contract NASw-2483)

(NASA-TT-F-15504) Avail: NTIS HC \$4.00 CSCL 05E

A description is given of exercises to be used for training pilots and cosmonauts. The types of exercises and the equipment to be used are itemized. Author

N74-21738# Joint Publications Research Service, Arlington,
 Va.

A BAROMETER OF CONTROL

Boris Fedorovich Lomov and Valeriy Anisimov 22 Apr. 1974
 11 p Transl. into ENGLISH from Tekhn. i Nauka (Moscow),
 no. 10, 1973 p 13-15

(JPRS-61807) Avail: NTIS HC \$4.00

The interrelationship between the fields of cybernetics and engineering psychology is examined and specific implications of these sciences for human behavior are developed. Author

N74-21739*# Techtran Corp., Glen Burnie, Md.

STUDY OF THE OPERATIVE REST STATE IN MAN

K. S. Tochilov, V. M. Ukhin, and A. I. Shabanov Washington
 NASA May 1974 12 p refs Transl. into ENGLISH from
 Nerv. Sist. (USSR), no. 11, 1970 p 99-105

(Contract NASw-2485)

(NASA-TT-F-15564) Avail: NTIS HC \$4.00 CSCL 06B

A four-hour laboratory test was conducted to study the physiological aspects of simple expectation of the presentation of emergency light and sound signals and such expectation accompanied by additional electric stimulation of the muscular nerves of the lower extremities. The results of the experiment are presented and discussed in the context of automation of labor. Author

N74-21740* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
POWER SPECTRAL DENSITY ANALYSIS OF THE ELECTROMYOGRAM FROM A WORK TASK PERFORMED IN A FULL PRESSURE SUIT Ph.D. Thesis - Houston Univ.
 Earl V. LaFevers May 1974 89 p refs
 (NASA-TM-X-58136; JSC-09004) Avail: NTIS HC \$7.50 CSCL 06B

Surface electromyograms (EMG) taken from three upper torso muscles during a push-pull task were analyzed by a power spectral density technique to determine the utility of the spectral analysis for identifying changes in the EMG caused by muscular fatigue. The results confirmed the value of the frequency analysis for identifying fatigue producing muscular performance. Data revealed reliable differences between muscles in fatigue induced responses to various locations in the reach envelope at which the subjects were required to perform the push-pull exercise, and the differential sensitivity of individual muscles to the various reach positions; i.e., certain reach positions imposed more fatigue related shifts in EMG power than did others. It was found that a pressurized space suit changed the pattern of normal shirt-sleeve muscle fatigue responses in all three of the muscles. Author

N74-21741* Massachusetts Inst. of Tech., Cambridge. Dept. of Nutrition and Food Science.

MECHANISMS OF DETERIORATION OF NUTRIENTS
 Annual Report, 13 Mar. 1973 - 13 Mar. 1974

Marcus Karel and James M. Flink 13 Mar. 1974 204 p refs (Contract NAS9-12485)

(NASA-CR-134247) Avail: NTIS HC \$13.25 CSCL 06H

Methods are reported by which freeze dried foods of improved quality will be produced. The applicability of theories of flavor retention has been demonstrated for a number of food polymers, both proteins and polysaccharides. Studies on the formation of structures during freeze drying have been continued for emulsified systems. Deterioration of organoleptic quality of freeze dried foods due to high temperature heating has been evaluated and improved procedures developed. The influence of water activity and high temperature on retention of model flavor materials and browning deterioration has been evaluated for model systems and food materials. Author

N74-21742* Scientific Translation Service, Santa Barbara, Calif.

RESULTS OF MEDICAL AND BIOLOGICAL STUDIES PERFORMED DURING THE GEMINI AND APOLLO PROGRAMS: CHANGES IN THE WORKING CAPACITY OF THE ASTRONAUTS

Z. I. Kopanov and Ye. M. Yuganov Washington NASA Apr. 1971 34 p refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR, Ser. Biol. (USSR), no. 1, 1974 p 5-20 (Contract NASw-2483)

(NASA-TT-F-15503) Avail: NTIS HC \$4.75 CSCL 05E

A survey of the literature on the psychosensory reaction of the astronauts, the flight programs carried out by them, and the results of postflight examinations employing various tests has shown that some astronauts noticed symptoms of a decrease in working capacity during space flights. Some of the problems involved in the prevention of unfavorable influences of spaceflight factors on the human organism are discussed. Author

N74-21743# Joint Publications Research Service, Arlington, Va.

PROBLEM OF ENGINEERING-PSYCHOLOGY EXPERIMENT AND ITS INSTRUMENTATION

V. I. Butov 9 May 1974 14 p refs Transl. into ENGLISH from Vestn. Leningr. Univ. (Leningrad), no. 23, 1973 p 77-86 (JPRS-61942) Avail: NTIS HC \$4.00

Theoretical and practical bases are given for methods to construct experimental models to be used for laboratory reproduction or prediction of human operator performance in man machine systems. Author

N74-21744# European Space Research Organization, Paris (France).

CURRENT RESEARCH WORK AT THE INSTITUTE FOR AEROSPACE MEDICINE

Mar. 1974 276 p refs Transl. into ENGLISH of Aktuelle Forschungsarb. aus dem Inst. fuer Flugmed., DLR-FB-73-15, DFVLR, 1973

(ESRO-TT-35; DLR-FB-73-15) Avail: NTIS HC \$17.00; DFVLR, Porz, West Ger. 64 DM

Results of experimental research are reported. The following topics are dealt with: selection and work load of air crews; effects of transmeridian flights on circadian rhythms, vibration, acceleration, and weightlessness; and hyperbaric and underwater medicine and technology.

N74-21745 European Space Research Organization, Paris (France).

WING ANOMALIES IN THE FLOUR BEETLE TRIBOLIUM CONFUSUM CAUSED BY SIMULATION OF WEIGHTLESSNESS

W. Briegleb et al. In its Current Res. Work at the Inst. for Aerospace Med. (ESRO-TT-35) Mar. 1974 p 1-15 refs Transl. into ENGLISH of Aktuelle Forschungsarb. aus dem Inst. fuer Flugmed., DLR-FB-73-15, DFVLR, 1973 p 7-19

The beetles' eggs were cultivated in 4 mm tubes, and the results were examined after 3 generations. A highly significant morphogenetic effect with a radiomimetic character was observed. In particular, teratogene wing anomalies were observed, similar to a spontaneous mutation, and with similar characteristics as those of beetles flown in Biosatellite 2. ESRO

N74-21746 European Space Research Organization, Paris (France).

A NEW METHOD FOR RECORDING THE HEART AND RESPIRATORY RATES OF COCKPIT CREWS IN FLIGHT

H. Bruner et al. In its Current Res. Work at the Inst. for Aerospace Med. (ESRO-TT-35) Mar. 1974 p 17-31 refs Transl. into ENGLISH of Aktuelle Forschungsarb. aus dem Inst. fuer Flugmed., DLR-FB-73-15, DFVLR, 1973 p 21-33

A method is described for inflight recording of heart and respiratory rate of pilots, by means of nose-clip transducers, in order to determine the total flight stress during short flights, and especially the psychophysical stress during take-off and landing. The sensors contain phototransistors for heart rate and NTC resistors for respiratory rate. The recording is done on a 12 decade printer at minute intervals. An example is given of a printout of heart and respiratory rate for pilot and copilot during approach and landing. ESRO

N74-21747 European Space Research Organization, Paris (France).

RELATIONS BETWEEN SOCIOMETRIC VARIABLES AND CRITERIA OF PROFICIENCY OR BEHAVIOR IN TRAINEE PILOTS

S. Fichtbauer In its Current Res. Work at the Inst. for Aerospace Med. (ESRO-TT-35) Mar. 1974 p 33-53 refs Transl. into ENGLISH of Aktuelle Forschungsarb. aus dem Inst. fuer Flugmed., DLR-FB-73-15, DFVLR, 1973 p 35-54

Some hypotheses about positive relations between sociometric variables (choice for group-leader, choice for friend, coherence of group) and criteria of proficiency or behavior (flying proficiency, application to duties, emotional stability) were tested on two samples of student pilots at a civil flight training center. The data from the first sample were gathered at the end of final training, the data from the second one at the end of an early phase of training. Author (ESRO)

N74-21748 European Space Research Organization, Paris (France).

A NEW METHOD FOR SALVAGING SUNKEN SHIPS AND WORKING UNDER WATER AT GREAT DEPTHS

H. D. Fust In its Current Res. Work at the Inst. for Aerospace

Med. (ESRO-TT-35) Mar. 1974 p 55-70 refs Transl. into ENGLISH of Aktuelle Forschungsarb. aus dem Inst. fuer Flugmed., DLR-FB-73-15, DFVLR, 1973 p 55-67

The method combines diving bell and caisson techniques, and can be used to recover wrecks of maximally 20 m length, 4 m width, and 25 m height. An underwater crew compartment is foreseen for longer periods of work (6, 11, and 21 days). The first operation planned is salvaging a Viking ship at 5 m water depth, at the sea bottom. The problems of the application of this method at greater depth (30 to 50 m), in connection with an underwater station were investigated. Observations were made concerning the safety measures necessary in case of long period work in an overpressure environment. ESRO

N74-21749 European Space Research Organization, Paris (France).

PSYCHODIAGNOSTIC PROBLEMS IN THE SELECTION OF AVIATION PERSONNEL IN DEVELOPING COUNTRIES

K. M. Goeters *In its Current Res. Work at the Inst. for Aerospace Med. (ESRO-TT-35) Mar. 1974 p 71-105 refs Transl. into ENGLISH of Aktuelle Forschungsarb. aus dem Inst. fuer Flugmed., DLR-FB-73-15, DFVLR, 1973 p 69-102*

Forty three subjects applying for three aviation occupations (pilot, air traffic controller, and technician) from the developing Yemen Arabic Republic were tested with psychological tests for seven cognitive abilities and two personality traits. Problems of test selection application are discussed. Normative data and reliabilities of the tests are reported. The structure of the cognitive performances and of the personality scores are analyzed (partially with the help of a factor analysis). Author (ESRO)

N74-21750 European Space Research Organization, Paris (France).

CONCENTRATION TASKS UNDER PSYCHICAL STRESS

H. Kirsch *In its Current Res. Work at the Inst. for Aerospace Med. (ESRO-TT-35) Mar. 1974 p 107-122 refs Transl. into ENGLISH of Aktuelle Forschungsarb. aus dem Inst. fuer Flugmed., DLR-FB-73-15, DFVLR, 1973 p 103-115*

Resulting factors of simple search and arithmetic problems were examined. The concentration stress test (CST) of Kirsch was applied. The test consisted of ten working columns, each of which is given one minute to work. Here the working times are changed so that initial working time is prolonged, while the working time for each column is steadily shortened. This resulted in an increasing time-stress which leads to a significant decrement of achievement below expected value with a sample of 300 applicants. Reliability and validity coefficients are given for the CST as a testing procedure in the selection of pilot applicants. Author (ESRO)

N74-21751 European Space Research Organization, Paris (France).

THE RESYNCHRONIZATION OF DIAN PERFORMANCE RHYTHMS FOLLOWING TRANSMERIDIAN FLIGHTS

K. E. Klein et al *In its Current Res. Work at the Inst. for Aerospace Med. (ESRO-TT-35) Mar. 1974 p 123-139 refs Transl. into ENGLISH of Aktuelle Forschungsarb. aus dem Inst. fuer Flugmed., DLR-FB-73-15, DFVLR, 1973 p 117-132*

The phase shifts in diurnal performance rhythms were observed in two groups of 8 students after transmeridian flights. It was found that the phase resynchronization takes between 4 to 5 days, and is of an exponential character. Its speed is determined by the following factors: the direction of the flight (west-east resynchronization took longer than vice-versa), the nature of the tested biologic functions, and activity modes of the subject after the flight. ESRO

N74-21752 European Space Research Organization, Paris (France).

A CASE OF EXTREME AIR EMBOLISM AND ITS SUCCESS-

FUL TREATMENT IN A HYPERBARIC CHAMBER

H. Oser *In its Current Res. Work at the Inst. for Aerospace Med. (ESRO-TT-35) Mar. 1974 p 141-159 refs Transl. into ENGLISH of Aktuelle Forschungsarb. aus dem Inst. fuer Flugmed., DLR-FB-73-15, DFVLR, 1973 p 133-149*

The successful treatment of a patient suffering from massive aeroembolism with ambient hyperbaric air is investigated. Such treatment was accomplished using a hyperbaric chamber which medical personnel could enter for care and control of the patient. The condition of the patient and the success of the therapy during the compression-, isopression- and decompression phase are described. Some criteria of the hyperbaric treatment are discussed, and recompression-tables for the treatment of caisson disease are recommended. It is shown that even in nearly hopeless cases of aeroembolism a hyperbaric treatment can still be successful. Author (ESRO)

N74-21753 European Space Research Organization, Paris (France).

THE GLUTAMIC ACID METABOLISM OF THE BRAIN AND ITS MODIFICATION THROUGH HYPERBARIC OXYGENATION

G. Schaefer *In its Current Res. Work at the Inst. for Aerospace Med. (ESRO-TT-35) Mar. 1974 p 161-175 refs Transl. into ENGLISH of Aktuelle Forschungsarb. aus dem Inst. fuer Flugmed., DLR-FB-73-15, DFVLR, 1973 p 151-168*

In brain extracts, the concentration of L-glutamic acid, gamma-amino-butyric acid (Gaba), and L-glutamine is significantly changed after breathing pure oxygen for about 70 hours. The reduction of the glutamic acid level occurring simultaneously with an increase of Gaba-concentration indicates an induction of inhibitory regulative mechanisms, whereas the elevation of the glutamine content seems to be an indication that larger amounts of ammonia are metabolized or detoxicated through O2 breathing. Author (ESRO)

N74-21754 European Space Research Organization, Paris (France).

PHYSICAL PRINCIPLES AND APPLICATION OF 0-G SIMULATION ACCORDING TO H. J. MULLER

A. Schatz et al *In its Current Res. Work at the Inst. for Aerospace Med. (ESRO-TT-35) Mar. 1974 p 177-193 refs Transl. into ENGLISH of Aktuelle Forschungsarb. aus dem Inst. fuer Flugmed., DLR-FB-73-15, DFVLR, 1973 p 169-182*

The theory of weightlessness simulation is developed for a single body system and applied to a simple cell mode. The conditions for good simulation are discussed and results show these conditions can be fulfilled without difficulties. Modifications of the model necessary for a further approximation to biology are described. Author (ESRO)

N74-21755 European Space Research Organization, Paris (France).

A CONTRIBUTION TO THE DIAGNOSIS AND PROGNOSIS OF THE PILOT'S BEHAVIOR UNDER PSYCHICAL STRESS

K. Steininger *In its Current Res. Work at the Inst. for Aerospace Med. (ESRO-TT-35) Mar. 1974 p 195-214 refs Transl. into ENGLISH of Aktuelle Forschungsarb. aus dem Inst. fuer Flugmed., DLR-FB-73-15, DFVLR, 1973 p 183-200*

The prognosis of the resistance to any psychologically impairing stress is considered in view of its importance in selecting pilot applicants. The chance of predicting such complex behavior as stress reactions depends on the correlations between certain personality factors, the intensity of individually experienced feeling of stress, and the specific features of several psychical disorders. It should be possible to identify some personality factors as specific risk factors for the occurrence of certain psychical failures or disorders. Author (ESRO)

N74-21756 European Space Research Organization, Paris (France).
THE INTERRELATIONSHIP BETWEEN GRAVITY AND MECHANICAL IMPEDANCE IN SUPINE HUMANS
 L. Vogt et al. *In its Current Res. Work at the Inst. for Aerospace Med.* (ESRO-TT-35) Mar. 1974 p 215-236 refs. Transl. into ENGLISH of Aktuelle Forschungsarb. aus dem Inst. fuer Flugmed., DLR-Fb-73-15, DFVLR, 1973 p 201-220

Measurements of the mechanical impedance of the supine human body under sustained acceleration were conducted to investigate the nonlinearities of the body system. A hydraulically driven shake table was installed on a centrifuge, and the transmitted force acceleration of the platform on which the subject was lying, were recorded. The results show that sustained acceleration stiffens the human body with increasing + G sub x and shifts the resonance to higher values. The results are explained by way of a multidegree-of-freedom system. This contributes to a better insight into the behavior of the human body under high amplitude vibration, buffering, and impact environments. Author (ESRO)

N74-21757 European Space Research Organization, Paris (France).
CHANGES IN THE 24-HOUR RHYTHM AFTER TWO TRANSATLANTIC FLIGHTS IN RAPID SUCCESSION
 H. M. Wegmann et al. *In its Current Res. Work at the Inst. for Aerospace Med.* (ESRO-TT-35) Mar. 1974 p 237-253 refs. Transl. into ENGLISH of Aktuelle Forschungsarb. aus dem Inst. fuer Flugmed., DLR-FB-73-15, DFVLR, 1973 p 221-235

The effects of two transatlantic flights in rapid sequence upon the 24-hour rhythm of body functions and performance were studied in 8 male subjects. Studies were made of outgoing and return flights between Frankfurt and Chicago with a time shift of 6 hours and a stopover time of 26 hours. The results and their operational significance for flying personnel are discussed. Author (ESRO)

N74-21758 European Space Research Organization, Paris (France).
THE EFFECT OF DEFINED SHOCK WAVES ON EXPERIMENTAL ANIMALS
 O. Wuensche et al. *In its Current Res. Work at the Inst. for Aerospace Med.* (ESRO-TT-35) Mar. 1974 p 255-270 refs. Transl. into ENGLISH of Aktuelle Forschungsarb. aus dem Inst. fuer Flugmed., DLR-FB-73-15, DFVLR, 1973 p 237-252

In connection with the problems of high speed impact, the special effect of shock waves transmitted through different materials upon miniature pigs were investigated. In particular, those typical and reproducible injuries of organs which are caused by defined shock waves on predetermined body regions are described. In discussing the morphological findings, the particulars of the special damage effects were considered. Author (ESRO)

N74-21759# Human Engineering Labs., Aberdeen Proving Ground, Md.
HELHAT 2 - SCOUT CREW/OBSERVER TARGET DETECTION FLIGHT TESTS
 Jan. 1974 23 p
 (AD-773686; HEL-TN-1-74) Avail: NTIS CSCL 05/10

The HELHAT 2 flight test compared the target detection capability of helicopter scout crews and single observers flying in an OH-58 Kiowa at above the ground levels of 80 to 300 feet. An ancillary test employing six crews, gave some information on the target detection capability of scout crews in the nap-of-the-earth flight reign. 1 to 30 feet. Author (GRA)

N74-21760# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
EVALUATION OF ARTERIAL OXYGEN CONCENTRATION IN HUMANS EXPOSED TO Gz Gx ACCELERATION FORCES
Final Report
 F. M. Holden and D. B. Rogers Nov. 1973 17 p refs (AF Proj. 7222)

(AD-773827; AMRL-TR-73-81) Avail: NTIS CSCL 06/1

The study describes the development of a candidate dynamic model to predict arterial oxygen concentrations based on the dynamics of ventilation and perfusion. Measurements from humans and animals exposed to centrifugation are used to define the physiological parameters. Both steady state and dynamic changes in oxygen saturation due to Gz and Gx acceleration are considered. The reliability of the predictions of the model are verified and its value relative to aerial combat performance set forth. Author (GRA)

N74-21761# Stanford Univ., Calif. Electronics Labs.
BIOCYBERNETIC FACTORS IN HUMAN PERCEPTION AND MEMORY **Semiannual Report, 1 Jun. - 30 Nov. 1973**
 David C. Lai Nov. 1973 58 p refs
 (Contract DAH15-72-C-0232; ARPA Order 2190)
 (AD-773393; TR-6741-2) Avail: NTIS CSCL 05/10

The primary concern of the research project is the development of biocybernetic concepts and techniques required for the analysis and development of skills useful for the manipulation and control of memory functions, particularly those related to the more concrete (eidetic) images. In particular, the authors are concentrating on the problem of achieving biocybernetic expansion of human visual memory through the use of real-time computerized monitoring and feedback of cues that serve as keys to memory encoding and retrieval. The approach represents a more or less, logical extension of the considerable evidence that the human nervous system depends heavily upon spatial and temporal cues both in the encoding and decoding of memories, especially sensory images. GRA

N74-21762# Logicon, Inc., San Diego, Calif.
AUTOMATED FLIGHT TRAINING (AFT). GCI/CIC AIR ATTACK **Final Report, Feb. 1972 - Jul. 1973**
 John P. Charles, Robert M. Johnson, and Jay R. Swink Nov. 1973 129 p
 (Contract N61339-72-C-0108)
 (AD-772593; SDR-140; NAVTRAEQUIPCEN-72-C-0108-1)
 Avail: NTIS CSCL 05/9

A feasibility demonstration of the application of automated-adaptive training techniques for air-to-air intercept training in a flight simulator was conducted. The training task included three phases: (1) a climb task under GCI/CIC control, (2) an attack phase under RIO control and a steering dot display, and (3) a descent phase also under GCI/CIC control. Sidewinder-type missile intercepts including head-on, forward-quarter, and beam runs were incorporated into a training syllabus. Atmospheric turbulence, aircraft configuration, and bank angle were employed as adaptive variables. Performance was objectively measured for each phase, and the syllabus was restructured (on-line) based on that performance. (Modified author abstract) GRA

N74-21763# School of Aerospace Medicine, Brooks AFB, Tex.
DEVELOPMENT OF THE USAF SCHOOL OF AEROSPACE MEDICINE (USAFSAM) PORTABLE THERAPEUTIC LIQUID OXYGEN (LOX) BREATHING SYSTEM **Final Report, Jan. 1969 - Feb. 1973**
 Constance R. Sturim Dec. 1973 12 p
 (AF Proj. 4054)
 (AD-772697; SAM-TR-73-47) Avail: NTIS CSCL 06/11

The USAFSAM portable therapeutic liquid oxygen (LOX) breathing system was designed to meet an urgent operational requirement to provide a portable, low pressure, therapeutic oxygen system for use on multimission aeromedical aircraft that do not have an integral therapeutic oxygen system. Specifications required that the systems be safe, compact, lightweight, and self-contained. They were to be capable of delivering therapeutic oxygen at rates from 8 to 10 liters per minute to two patients simultaneously for a minimum of 6 hours. Compatibility of the system with all USAF approved ventilatory, resuscitative, and inhalation therapy equipment was required. The evaluations indicated the portable LOX system performed the function for which it was designed in a satisfactory manner and recommended it be standardized for routine use in Air Force aeromedical evacuation missions. (Modified author abstract) GRA

N74-21784# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

AN IMPROVED CARDIOTACHOMETER INPUT CIRCUIT FOR HEART RATE DETERMINATION

Adolf R. Marko, Arthur G. Nielson, and Thomas H. Ebert Sep. 1973 29 p refs
(IAF Proj. 7222)

(AD-773812; AMRL-TR-73-50) Avail: NTIS CSCL 06/1

Electronic data processing of electrocardiogram signals for determining heart rate requires signals with a minimum of interference and amplitude or wave form variations. In many environmental stress research experiments, the electrocardiogram signal is disturbed by movement artifacts, muscle action potentials, power line frequency interference, and other electrical noise sources. Computer programming techniques may be used to improve the accuracy of heart rate determinations under noise interference but requires valuable computer capability. A comparatively inexpensive cardiometer input circuit has been developed that delivers a standard pulse of constant width and amplitude for every R-wave of the electrocardiogram. The circuit may also be useful to improve accuracy and reliability of cardiometers and cardiac alarm devices. Detail function and operation description, performance tests, and results from on line application are presented in the report. (Modified author abstract) GRA

N74-21765# California Univ., Irvine.

BIOCYBERNETICS: AN INTERACTIVE MAN-MACHINE INTERFACE Annual Technical Report, 1 Jan. - 31 Dec. 1973

R. F. Thompson and T. J. Taylor 20 Feb. 1974 45 p refs
(Contract DAHC15-72-C-0121; ARPA Order 1001)
(AD-774987) Avail: NTIS CSCL 05/8

The research reported involves the detection of human bioelectric phenomena that have been made analogues of ongoing, cognitive processes and the utilization of these phenomena to control and/or communicate with external devices. The technique is applicable to situations requiring rapid human intervention in the control of complex systems operation. The major advantage of this project is the virtually automatic control of systems by the trained subject. GRA

N74-21766# Educational Testing Service, Princeton, N.J.
DEVELOPMENT AND VALIDITY OF A VOCATIONAL AND OCCUPATIONAL INTEREST INVENTORY

Gary J. Echternacht, Richard R. Reilly, and Patty J. McCaffrey Dec. 1973 81 p refs
(Contract F41609-72-C-0030; ILIR Proj. 00-12)
(AD-774573; AFHRL-TR-73-38) Avail: NTIS CSCL 05/9

Over 3,100 airmen and 300 recruits in basic training returned interest inventories, termed the Vocational and Occupational Interest Choice Examination (VOICE). Items forming the inventory were primarily generated by examining job analyses in relation to the airman classification structure. Both a priori and occupational scales were developed based on responses obtained by mail inventory administration of airmen who indicated satisfaction with their career fields. Scales were developed on half-samples and a cross-validation technique employed. A comparison was made, in order to assess validity, of the number of individuals correctly predicted to be members of a service career field or men-in-general using the scales versus the number of individuals one would expect to correctly predict without use of the scales. Scale weights developed in one half-sample were applied to responses obtained in the other half-sample in the above comparison. (Modified author abstract) GRA

N74-22712*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.

REFLECTANCE MODEL OF A PLANT LEAF

R. Kumar and L. Silva 1973 29 p
(Grant NGL-15-002-112)

(NASA-CR-138251; LARS-IN-022473) Avail: NTIS HC \$4.50 CSCL 06C

A light ray, incident at 5 deg to the normal, is geometrically plotted through the drawing of the cross section of a soybean

leaf using Fresnel's Equations and Snell's Law. The optical mediums of the leaf considered for ray tracing are: air, cell sap, chloroplast, and cell wall. The above ray is also drawn through the same leaf cross section considering cell wall and air as the only optical mediums. The values of the reflection and transmission found from ray tracing agree closely with the experimental results obtained using a Beckman DK-2A Spectroreflectometer. Similarly a light ray, incident at about 60 deg to the normal, is drawn through the palisade cells of a soybean leaf to illustrate the pathway of light, incident at an oblique angle, through the palisade cells
Author

N74-22713*# Massachusetts Univ., Amherst. Dept. of Biochemistry.

CHANGES IN SULFHYDRYL GROUPS OF HONEYBEE GLYCERALDEHYDE PHOSPHATE DEHYDROGENASE ASSOCIATED WITH GENERATION OF THE INTERMEDIATE PLATEAU IN ITS SATURATION KINETICS

W. G. Gelb, J. F. Brandts, and J. H. Nordin [1973] 42 p refs
(Grant NGL-22-010-029)

(NASA-CR-138379) Avail: NTIS HC \$5.25 CSCL 06A

Honeybee and rabbit muscle GPDH were studied to obtain information at the chemical level regarding anomalous saturation kinetics of the honeybee enzyme. Results demonstrate that the enzyme's sulfhydryl groups are implicated in the process. Measured by DTNB titration, native honeybee GPDH has one less active SH than the native rabbit muscle enzyme and displays changes in overall sulfhydryl reactivity after preincubation with G-3-P or G-3-P plus NAD⁺. The total DTNB reactive sulfhydryls of rabbit muscle GPDH are not changed by preincubation with NAD⁺ or G-3-P; honeybee GPDH, under certain conditions of preincubation with these ligands, shows a decrease of two total DTNB reactive SH groups. This difference has been confirmed by an independent experiment in which the two enzymes were carboxymethylated with C-14 bromoacetic acid. Author

N74-22714*# Colorado State Univ., Fort Collins.

[NARCOSIS STUDIES AND OXYGEN POISONING OF MICE]
Semiannual Status Report

31 Oct 1973 51 p refs
(Grant NGR-06-002-075)

(NASA-CR-137458) Avail: NTIS HC \$5.75 CSCL 06C

The research for a mechanism by which narcotic gases alter metabolism is reported. Possible sites of action by narcotic and anesthetic gases in isolated electron transport particles were explored. Using the relative activities of the NADH-oxygen, NADH-ferricyanide, succinate-cytochrome C and succinate-NAD oxidoreductase systems as parameters, the relative potency of volatile anesthetics were tested. Testing the relative ability of human subjects to contract and repay an oxygen debt while in the narcotic versus alert state, it was found that narcosis induced by 33% nitrous oxide increased the size of the oxygen debt contracted and the amount of oxygen required to repay it during recovery. Mice acclimatized to sea level (760 mm Hg), 5000 feet (632 mm Hg) or 15,000 feet (437 mm Hg) for from one to eight weeks were found to be more susceptible to convulsion and death as a function of altitude acclimatization when tested in hyperoxic environments. There were no reasonable explanations for the connection between hypoxia and oxygen poisoning but several practical implications for persons living at altitude are discussed. Author

N74-22715*# Techtran Corp., Glen Burnie, Md.

PATHOLOGICAL PHYSIOLOGY OF EXTREMAL STATES IN EXOGENIC INTOXICATIONS

S. N. Golikov, P. D. Gorizontov, ed., and N. N. Sirotinin, ed. Washington: NASA May 1974 38 p refs Transl. into ENGLISH from the book "Patologicheskaya Fiziologiya Ekstremalnykh Sostoyaniy" Moscow, Meditsina Press, 1973 p 267-289
(Contract NASw-2485)

(NASA-TT-F-15321) Avail: NTIS HC \$5.00 CSCL 06E

Data systemization of toxicological pathophysiology exogenous intoxicators was studied using modern concepts and mechanisms which define the action of various poisons. Characteristics,

symptoms, syndromes, treatment, and prevention were considered in addition to the extremal states of shock, collapse, coma, and agony.
Author

N74-22716*# Techtran Corp., Glen Burnie, Md.
THE MOTOR PRESENT STATE IN MAN UNDER WATER IMMERSION CONDITIONS

A. V. Ovsyannikov Washington NASA May 1974 10 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (Leningrad), v. 58, no. 3, Mar. 1972 p 305-310
(Contract NASw-2485)

(NASA-TT-F-15583) Avail: NTIS HC \$4.00 CSCL 06S

The functional state of the segmental apparatus before voluntary movement was investigated in subjects under water immersion conditions. The H-reflex was used to evaluate the excitability of the spinal cord motoneurons. On the third, fourth, and fifth days of water immersion the increase in motoneuron pool excitability began 30 msec before EMG rather than the normal 60 msec. The absence of increase in excitability over the interval of 60-30 msec prior to movement is considered to be the consequence of disuse of the suprasegmental nervous structure involved in the spinal postural readjustment mechanisms.
Author

N74-22717*# Kanner (Leo) Associates, Redwood City, Calif.
THE BED

Washington NASA May 1974 7 p refs Transl. into ENGLISH from S. African Med. J. (Capetown), v. 43, no. 11, Mar. 1969 p 289-290
(Contract NASw-2481)

(NASA-TT-F-15582) Avail: NTIS HC \$4.00 CSCL 06S

Some of the pathological effects of bed rest on the patient are discussed: the heart's work production increases by 30% in the prone position; autonomic nervous control of vascular tone is curtailed; excretion of calcium and nitrogen increases; incontinence is often found in older patients. Recent considerations about the therapeutic value of bed rest, and a re-evaluation of its efficacy, give rise to changes in hospital planning.
Author

N74-22718*# Kanner (Leo) Associates, Redwood City, Calif.
ANALYSIS OF CARDIAC RHYTHM DURING ATHEROSCLEROSIS AND HYPERTONIA IN SURGICAL PATIENTS USING A SPECIALIZED COMPUTER

M. I. Kuzin, E. A. Bogdanova, V. A. Sakharov, and N. G. Khaltayev Washington May 1974 14 p refs Transl. into ENGLISH from Klinich. Med. (Moscow), no. 12, Dec. 1973 p 19-24
(Contract NASw-2481)

(NASA-TT-F-15583) Avail: NTIS HC \$4.00 CSCL 06P

Measurements of 400 intervals on the EGG were recorded with an accuracy to 1 msec in 64 patients and 30 healthy individuals. Interval histograms were analyzed and cardiointervalograms are presented in figures and graphic form, EGG, polycardiograms, respiration curves. The cardiac rhythm was more stable in patients than in healthy individuals, especially in cases of marked changes in the contractile capacity of the myocardium. In the group of patients with a more variable rhythm, there were observed changes in the conducting system of the heart. Dynamic observations in the course of the preoperative preparation showed that variability criteria can be used for the control of the conducted therapy.
Author

N74-22719*# Kanner (Leo) Associates, Redwood City, Calif.
SENSE AND NONSENSE ABOUT BED REST AS A THERAPEUTIC MEASURE

G. Brueschke, J. Haase, J. Herrmann, and D. Voigt Washington NASA May 1974 9 p refs Transl. into ENGLISH from Deut. Gesundheitsw. (West Germany), v. 24, 1969 p 2465-2467
(Contract NASw-2481)

(NASA-TT-F-15586) Avail: NTIS HC \$4.00 CSCL 06E

The practice of indiscriminately confining patients to bed is criticized. Confinement to bed causes more physical and psychic complications than other pharmacotherapeutic measures and some of these complications are described. Expanded opportunities for

physical exercise for hospitalized patients are urged with immobilization restricted to the part of the body for which it is absolutely required.
Author

N74-22720*# Kanner (Leo) Associates, Redwood City, Calif.
THE EFFECT OF PROLONGED BODILY INACTIVITY ON CARBOHYDRATE TOLERANCE

Otfried Guenther and Rainer Frenzel Washington NASA May 1974 13 p refs Transl. into ENGLISH from Z. Gesam. Inn. Med. (East Germany), v. 24, 1969 p 814-817
(Contract NASw-2481)

(NASA-TT-F-15587) Avail: NTIS HC \$4.00 CSCL 06P

The influence of prolonged bodily inactivity on carbohydrate tolerance was investigated. Prednisone-glucose-tolerance tests were conducted at 4-week intervals on 20 patients confined to bed for at least 8 weeks because of diseases known not to have any direct influence on carbohydrate metabolism. In two cases, the patients were reexamined 2 years after remobilization. The following results were obtained: (1) Reductions in carbohydrate tolerance can be brought about by prolonged bodily inactivity alone. (2) The more complete the immobilization, and the longer it lasts, the greater the impairment of carbohydrate metabolism. (3) Carbohydrate tolerance reductions due to confinement in bed are observed almost exclusively in older persons. (4) As a rule, these disturbances of carbohydrate metabolism are reversible after remobilization.
Author

N74-22721*# Scientific Translation Service, Santa Barbara, Calif.

THE PROBLEM OF STRUCTURAL ANALYSIS OF BIOLOGICAL RHYTHMS

D. S. Sarkisov Washington NASA May 1974 19 p refs Transl. into ENGLISH from Arkh. Patol. (Moscow), v. 35, no. 12, 1973 p 3-11

(Contract NASw-2483)

(NASA-TT-F-15592) Avail: NTIS HC \$4.00 CSCL 06P

Several patterns in the adaptation reaction of the human body when stimuli are applied at various rhythms are studied. Electron microscopy, autoradiography and histochemistry are used for a structural analysis of adaptation reactions of the body at the intracellular level.
Author

N74-22722*# Kanner (Leo) Associates, Redwood City, Calif.
A STUDY ON THE ROLE OF THE BRAIN IN THE ESTABLISHMENT OF ADAPTATION TO REPEATED IMMOBILIZATION STRESS. PART 1: CHANGES IN BRAIN ACTIVITY AND BODILY FUNCTIONS UNDER REPEATED IMMOBILIZATION STRESS

Masahiro Yanase Washington NASA May 1974 38 p refs Transl. into ENGLISH from J. Japan. Physiol. Soc., v. 35, 1973 p 109-124

(Contract NASw-2481)

(NASA-TT-F-15603) Avail: NTIS HC \$5.00 CSCL 06P

A 6-hour immobilization was applied to rabbits for 7 successive days and the establishment of adaptation was investigated. Decreases in food intake, water intake and urine volume in the early stage of the application were reversed after repeated stresses. Although the first immobilization effected decreases in rectal temperature, glucose tolerance, oxidation of glucose and short chain fatty acids in liver slices, and changed the response of the heart rate to mecholyt, the seventh immobilization had little effect on these. Therefore, adaptation to the immobilization can be considered to appear after repeated exposures to stress. The threshold of stimulation in the midbrain reticular formation inducing neocortical EEG arousal decreased under the immobilization stress, and that in the dorsomedial nucleus of the thalamus increased. Changes in multiple unit activity in the ventromedial nucleus, anterior hypothalamic area, preoptic area and hippocampus under the first immobilization stress diminished with repeated stresses.
Author

N74-22723*# Kanner (Leo) Associates, Redwood City, Calif.
THE EFFECT OF LOCAL APPLICATION OF Ca, K, AND Na ON THE TEMPERATURE CENTER STIMULATED BY

VARIOUS PYROGENIC SUBSTANCES

O. Kym Washington NASA May 1974 27 p refs Transl. into ENGLISH from Arch. Exp. Pathol. Pharmacol. (Berlin), v. 176, 1934 p 408-424

(Contract NASw-2481)

(NASA-TT-F-15629) Avail: NTIS HC \$4.50 CSCL 06P

Intercerebral injection of CaCl₂ in rabbits prevented the fevers normally produced by intramuscular injection of beta-tetrahydronaphthylamine, ergotoxin, or hay infusion. When administered in the course of a fever produced by one of these agents, CaCl₂ halted the temperature rise and soon returned temperature to normal levels. Neither NaCl nor KCl showed these effects. Intracerebral injection of CaCl₂ also caused disturbances of balance. Anatomical localization of the calcium injections in the tuber region indicated the presence there of certain thermoregulatory and static-regulation systems. Author

N74-22724# Joint Publications Research Service, Arlington, Va.

TRANSLATIONS ON EASTERN EUROPE: SCIENTIFIC AFFAIRS NO. 409

3 May 1974 49 p refs Transl. into ENGLISH from Eastern Europe reports

(JPRS-61905) Avail: NTIS HC \$5.50

The age related changes of the cardiovascular system, visual and auditory organs, along with mental acuity and psychoneurotic stresses that effect the flight fitness of pilots is discussed. Case histories are presented concerning the morbidity of nephrolithiasis in pilots and the effects on flight fitness.

N74-22725 Joint Publications Research Service, Arlington, Va. **PILOTS: MIDDLE AGE: PHYSICAL FITNESS**

W. Schur *In its* Trans. on Eastern Europe: Sci. Affairs No. 409 (JPRS-61905) 3 May 1974 p 28-36 Transl. into ENGLISH from Z. Militärmed. (East Berlin), Nov. 1973 p 325-329

Middle aged pilots evidence age-related decrease in fitness which is of special concern in relation to their competence. These factors of biological age are discussed in terms of flight fitness: chronologic age; physical or physiological age; mental age; and emotional age. The age related changes of the cardiovascular system, visual and auditory organs, as well as mental acuity and psychoneurotic stresses are discussed. Conditioning and acceptance of a well planned flight training program can contribute significantly to the maintenance of professional fitness of pilots after the age of 40. K.M.M.

N74-22726 Joint Publications Research Service, Arlington, Va. **NEPHROLITHIASIS AND FLIGHT FITNESS: SELECTED CASES**

G. Poenisch, E. Richter, and W. Schur *In its* Transl. on Eastern Europe: Sci. Affairs No. 409 (JPRS-61905) 3 May 1974 p 37-41 refs Transl. into ENGLISH from Z. Militärmed. (East Berlin), Nov. 1973 p 329-330

Consideration is given to data on the morbidity, manifestations, and recurrence tendency of nephrolithiasis in pilots as they pertain to aviation medicine and the problem of flight qualifications. Three typical cases are presented and discussed. Author

N74-22727# Advisory Group for Aerospace Research and Development, Paris (France).

MANUAL OF AERONAUTICAL MEDICINE AND APPLICATION TO NAVIGATION PERSONNEL [MANUEL DE MEDECINE AERONAUTIQUE A L'USAGE DU PERSONNEL NAVIGANT]

T. G. Dobie (RAF) Dec. 1972 280 p In FRENCH (AGARDograph-154(FR); AGARD-AG-154(FR)) Avail: NTIS HC \$17.00

Diverse aerospace medical data are summarized. Summaries cover: mental and physical health, respiration and circulation, hypoxia prevention, pressure reduction effects, and effects of extreme heat on the body. Data are also given on air sickness,

noise and vibration, cabin pressurization and rapid decompression, vision, and survival. Several other related topics were also summarized. Transl. by E.H.W.

N74-22728*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ADENOSINE TRIPHOSPHATE (ATP) AS A POSSIBLE INDICATOR OF EXTRATERRESTRIAL BIOLOGY

Emmett W. Chappelle and Grace Lee Picciolo Washington May 1974 10 p refs

(NASA-TN-D-7680; G-7457) Avail: NTIS HC \$3.00 CSCL 06C

The ubiquity of adenosine triphosphate (ATP) in terrestrial organisms provides the basis for proposing the assay of this vital metabolic intermediate for detecting extraterrestrial biological activity. If an organic carbon chemistry is present on the planets, the occurrence of ATP is possible either from biosynthetic or purely chemical reactions. However, ATP's relative complexity minimizes the probability of abiogenic synthesis. A sensitive technique for the quantitative detection of ATP was developed using the firefly bioluminescent reaction. The procedure was used successfully for the determination of the ATP content of soil and bacteria. This technique is also being investigated from the standpoint of its application in clinical medicine. Author

N74-22729*# Techtran Corp., Glen Burnie, Md.

THE EFFECT OF PATHOGENIC FACTORS OF THE ARCTIC, ANTARCTICA AND AQUANAUTICS

F. A. Morokhov Washington NASA May 1974 36 p refs Transl. into ENGLISH from the book "Patologicheskaya Fiziologiya Ekstremal'nykh Sostoyaniy" Moscow, Med., 1973 p 349-369 (Contract NASw-2485)

(NASA-TT-F-15325) Avail: NTIS HC \$5.00 CSCL 06S

The pathological physiology of acclimatization processes and the extreme conditions occurring in response to the varied conditions of Antarctica, the Arctic, and aquanaautics are examined by way of analysis of individual extreme factors and the changes in the organism caused by them. Along with description of the pathological aspects of the various sets of conditions, recommendations are made for prophylactic measures to be taken to counteract the pathological influences. Author

N74-22730*# Scientific Translation Service, Santa Barbara, Calif.

THE HEART IN OBESITY, CLINIC

H. Schwalb and G. Schimert Washington NASA May 1974 22 p refs Transl. into ENGLISH from Med. Klin. (Munich), v. 65, 1970 p 1908-1913

(Contract NASw-2483)

(NASA-TT-F-15588) Avail: NTIS HC \$4.25 CSCL 06P

A review of the medical literature covering the effects of obesity on the heart is presented. Cardiovascular damage primarily identified are coronary sclerosis, hyperlipidemia, hypertonia, fatty degeneration, reduced functional range, reduction in physical exercise, increased volume load, disturbed respiration, electrocardiograph pathology, and angina pectoris. Author

N74-22731*# Scientific Translation Service, Santa Barbara, Calif.

ESSENTIAL OBESITY

F. Matzkies Washington NASA May 1974 15 p refs Transl. into ENGLISH from fortschr. Med. (Munich), v. 90, 1972 p 765-768

(Contract NASw-2483)

(NASA-TT-F-15589) Avail: NTIS HC \$4.00 CSCL 06P

Obesity is overweight by more than 10 kg. Essential obesity indicates unknown etiology. All cases derive from overeating for long periods, with lesser contribution from reduced exercise. Obesity reduces life expectancy through changes in the cardiovascular system, lungs, digestive organs, skeleton, and endocrine glands. The first step in therapy is motivating the patient to reduce weight. The usual measure is a reducing diet, especially with carbohydrate limitation. Formula diets are useful, and extensive weight loss can be attained by fasting under medical observation. Drugs are usually undesirable because of their side effects. Author

N74-22732# Joint Publications Research Service, Arlington, Va.

SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 8, NO. 2, 1974

24 May 1974 147 p refs Transl. into ENGLISH of Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974, p 1-90

(JPRS-62082) Avail: NTIS HC \$10.50

Summaries are given of data on the training and selection of cosmonauts. Summary data cover: evaluation and analysis of accumulated data to facilitate the on-going transition from orbital to interplanetary flights, research aimed at guaranteeing safety on long flights and reliability of the human component of the man-spacecraft system, space psychology and physiology, environmental problems and control, and telemetry.

N74-22733 Joint Publications Research Service, Arlington, Va.
CYTOLOGICAL AND CYTOGENETIC EFFECTS IN THE CELLS OF BACTERIA AND MAMMALS UNDER THE INFLUENCE OF ACCELERATED HEAVY IONS

Yu. G. Grigoryev, N. I. Ryzhov, B. S. Fedorenko, Ye. A. Krasavin, S. V. Vorozhtsova, L. A. Koshcheyeva, N. Ya. Savchenko, and V. F. Khlaponina *In its Space Biol. and Aerospace Med.*, Vol. 8 No. 2, 1974 (JPRS-62082) 24 May 1974 p 3-8 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 3-8

Studies were made of the biological effectiveness of post-radiation recovery processes and factors modifying radiological effects brought about by the action of heavy ions and standard radiations on bacterial *E. coli* B cells and mammalian cells. Heavy ions exhibited a more pronounced biological effect. Bacterial and mammalian cells exhibited somewhat similar responses to radiations with high linear energy losses (LEL). This is suggested by a similarity in the direction and picture of damage. There were also significant qualitative and quantitative differences related to the species and organization of the biological objects tested. This applies mainly to the different relationships between the relative biological effect changes and LEL.

Author

N74-22734 Joint Publications Research Service, Arlington, Va.
EFFECTS OF HYPOKINESIA ON THE LIPID COMPOSITION OF THE BLOOD AND TISSUES IN RABBITS OF DIFFERENT AGE

Yu. P. Rylnikov *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 8-13 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 8-13

Rabbits of two groups (older animals aged 2 to 2 1/2 years weighing 3.5 to 5.0 kg and younger animals aged 1 to 1 1/2 years weighing 2.5 to 3.0 kg) were confined in small cages. The exposure was accompanied by an increase in cholesterol in the blood, heart and liver. This increment was greater in animals of the older group. This was clearly expressed in the liver tissue. The level of total lipids in the heart and liver increased, conforming to the same pattern. The content of phosphatids in the heart and aorta decreased at the expense of sphingomyelins, lecithin, and cephalin in the older group and at the expense of lecithin and cephalin in the younger group. The dropoff in oxygen consumption was more clearly expressed in the older group. Accordingly, hypokinetic exposure in older age groups favors the development of atherosclerosis.

Author

N74-22735 Joint Publications Research Service, Arlington, Va.
CELL CHANGES IN RAT LIVERS DURING HYPOKINESIA
S. Ye. Li and O. I. Kirillov *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 13-17 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 13-17

Male rats of the Wistar line weighing 95 to 100 g were kept under hypokinetic conditions. Five to nine test and control

animals were sacrificed after 12 hours, two, six, nine, 14 and 19 days. The nuclear size, mitotic index, and number of binucleate cells in the liver were determined. During hypokinesia the absolute weight of the liver decreased whereas its relative weight increased. Nuclear ploidy decreased, the mitotic index declined and the number of binucleate cells more than doubled. It is assumed that some polyploid cells are transformed into binucleate cells which in turn are divided into mononuclear diploid cells.

Author

N74-22736 Joint Publications Research Service, Arlington, Va.
HYDROGEN BACTERIA AS A POSSIBLE SOURCE OF PROTEIN IN FOOD FOR MAN AND ANIMALS

V. I. Foanov, V. K. Kovalenkova, I. T. Troitskaya, L. A. Siletskaya, A. V. Novikova, and L. V. Vasilyeva *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 17-20 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 17-20

A study was made of the nutritional value of proteins from a biomass of hydrogen bacteria *Hydrogenomonas eutropha* of the Z-1 group on a Schlegel medium in Vedenina's modification. Before feeding animals the polymer of beta-hydroxybutyric acid was extracted with chloroform. A high biological value of the proteins from the biomass of hydrogen bacteria was demonstrated. Further investigations of the biochemical composition of the biomass are needed with respect to the changes noted in kidney tissues.

Author

N74-22739 Joint Publications Research Service, Arlington, Va.
PECULIARITIES OF REACTION OF THE RAT CEREBELLUM TO EXPOSURE TO CENTRIPETAL ACCELERATIONS AFTER PROLONGED HYPOKINESIA

L. D. Klimovskaya and N. P. Smirnova *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 29-34 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 29-34

White rats kept under conditions of prolonged hypokinesia were exposed to transverse accelerations Gx of 6 and 10 g. In acute experiments the induced activity of the cerebellar cortex was investigated in Nembutal-anesthetized rats before, during, and after rotation on a centrifuge. The amplitude of the electric response of the cerebellar cortex to stimulation of the sciatic nerve was found to increase on the 14th day of hypokinesia. The cerebellar response to acceleration decreased on the 35th to 40th days of hypokinesia and increased on the 55th to 60th days. In all stages of hypokinesia the force ratio was disturbed: on the 14th and on the 55th to 60th days responses to accelerations of 6 and 10 g became more dissimilar. A decrease in kinesthetic afferentation and a general increase in excitation due to stress effects contributed to the development of functional disorders in the cerebellar cortex during hypokinesia.

Author

N74-22740 Joint Publications Research Service, Arlington, Va.
DYNAMICS OF CIRCULATORY INDICES IN THE CREW OF THE SALYUT ORBITAL STATION DURING AN EXAMINATION UNDER REST CONDITIONS

V. A. Dagtyarev, V. G. Doroshev, N. D. Kalmykova, Z. A. Kirillova, and N. A. Lapshina *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 34-42 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 34-42

The main results of complex investigations of blood circulation for the crew of the Salyut orbital station under hypokinetic conditions are given. It was found that the levels of arterial pressure, blood output, work, and intensity of contraction of the left ventricle were relatively high. The dynamics of the principal indices of circulation during weightlessness has its specific peculiarities. One can observe the syndrome of shortening of the phase of isovolumetric contraction of the left ventricle, a considerable amplitude of fluctuations of individual indices during

repeated investigations, and an influence of accompanying factors associated with the crew's current activity aboard the station on the dynamics of circulation. Analysis of data in dependence on times of exposure to weightlessness did not exhibit a clear tendency in the change of most of the registered indices which could be related to the cumulative effect of weightlessness.

Author

N74-22741 Joint Publications Research Service, Arlington, Va. SOME PROBLEMS IN INTERACTION BETWEEN THE VESTIBULAR AND VISUAL ANALYZERS

A. Ye. Kurashvili and V. I. Babiyak *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 42-50 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 42-50

A study was made of the influence of the vestibular analyzer on fixation and tracking motions of the eye. Stimulation of the vestibular apparatus was accomplished by the rotation and calorization methods: oculomotor reactions were registered using an improved electrooculogram method. The authors studied the problem of visual perception of space coordinates and its modification under the influence of rotation and electric stimulation of the vestibular apparatus. The conclusion is drawn that the vestibular system, as a system sensing extrasubjective gravitational space constants, is most important in the formation of visual concepts of space coordinates. These concepts are reflected in the objective characteristics of oculomotor reactions. Author

N74-22742 Joint Publications Research Service, Arlington, Va. CLINICAL-PHYSIOLOGICAL ASPECTS OF EARLY FORMS OF AUTOMATIC-VASCULAR DISORDERS

A. Ya. Tizul and E. I. Matsnev *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 76-82 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 50-54

Examinations of 71 persons with polymorphous autonomic-vascular disturbances allowed clinical and physiological characterization of early forms of the dysfunctions which develop in so-called clinically healthy persons in the age group 25 to 40 years. Autonomic disorders occurred in 33.8% of the intellectuals who were not regularly engaged in physical work or sports. In addition to clinical tests, diagnosis of autonomic-vascular dysfunctions included specific provocative and training tests, the results of which were very important for the study and evaluation of autonomic reactions. Most patients with various mild clinical manifestations of autonomic dysfunctions exhibited a decline in the range of adaptive and compensatory capabilities of the human body which is manifested in an unsatisfactory tolerance to functional tests. Author

N74-22743 Joint Publications Research Service, Arlington, Va. CHANGES IN THE ELECTROCARDIOGRAM DURING ACUTE HYPOXIA AND THEIR SIGNIFICANCE

V. B. Malkin and V. I. Plakhatnyuk *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 83-92 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 54-61

The use of hypoxic hypoxia -- ascent to an altitude of 5,000 m in a normal atmosphere -- as a provocative test for detecting latent cardiac pathology is described and summarized. In 12,000 tests during which electrocardiographic studies were made of healthy male test subjects and subjects with neurocirculatory dystonia, in the age group 20 to 45 years, 3.66% of the cases exhibited ECG changes which were beyond the normal limits. In 82.93% of the cases conditionally pathological changes in the ECG were related to various disorders in the cardiac rhythm. In 9.33% of the cases they were related to conductivity disturbances and in 7.74% of the cases they were related to changes in the terminal part of the ventricular complex. Disorders in cardiac rhythm at an altitude of 5,000 m were the development or acceleration of extrasystolic events. During rare ventricular extrasystoles in hypoxia they either disappeared or were enhanced. Author

N74-22744 Joint Publications Research Service, Arlington, Va. EFFECT OF AN INCREASED CARBON DIOXIDE CONTENT ON THE PHAGOCYTOTIC ACTIVITY OF NEUTROPHILS AND THE LEVEL OF SIALIC ACIDS IN THE HUMAN BLOOD

M. V. Markaryan *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 93-96 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 61-63

A five-day exposure of man to an increased 3 to 5% carbon dioxide concentration in a small sealed chamber inhibited the phagocytic activity of neutrophils and reduced the level of sialic acids in the blood serum. A correlation was established between the carbon dioxide content in the inhaled air and the level of changes in the mentioned parameters. The highest level of phagocytic inhibition and decrease in sialic acid occurred when breathing a 5% carbon dioxide atmosphere. Author

N74-22745 Joint Publications Research Service, Arlington, Va. STUDY OF ORGANIZATION OF A FLIER'S ATTENTION DURING INSTRUMENT FLIGHT

I. D. Malinin and V. A. Ponomarenko *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 97-102 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 64-68

Avail: NTIS

An attempt was made to examine the phenomenon of switching of attention during instrumented flight from the point of view of the probability theory. To solve this problem, the method of evaluation of the distribution of attention of a flier from instrument to instrument using a concealed motion picture survey of his eyes was used. The motion picture films were interpreted using keys which represent the image of the fixed glance of the flier at the time of fixation of the eyes on each of the pilotage navigation instruments. Results indicate that the function of distribution and switching of attention during instrument flight is a determined and organized form of mental behavior for a flier in the aircraft control process. E.H.W.

N74-22746 Joint Publications Research Service, Arlington, Va. EVALUATION OF THE FUNCTIONAL STATE OF THE MYOCARDIUM IN FLIGHT PERSONNEL DETERMINED FROM CLINICAL-INSTRUMENTAL INVESTIGATIONS

V. M. Kondrakov *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 103-107 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 68-71

Electrocardiographic changes, polycardiographic, and hemodynamic parameters were analyzed in 146 pilots in the age group 39 to 57. With respect to ECG changes, the subjects (in the second group) with diffuse ECG changes exhibited a phase hypodynamic syndrome, a decrease in cardiac output, strength, and output of the left ventricle. Thirty percent of the first group subjects with a normal ECG exhibited changes in the early systolic phases, the energy parameters of cardiac activity indicating an inadequate contractability of the cardiac muscle. A comparative analysis of these changes helps in an objective evaluation of the functional capabilities of the cardiovascular system, in formulating a proper diagnosis of the disease, and in recommending rational treatment, as well as in making a well-substantiated expert decision. Author

N74-22747 Joint Publications Research Service, Arlington, Va. PRINCIPLES IN FORMULATING OPTIMUM SLEEP AND WAKEFULNESS REGIMES FOR MAN DURING PROLONGED SPACE FLIGHTS

A. N. Litsov *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 108-114 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 71-75

The main steps which can be taken to prevent unfavorable responses to cosmonauts to changes in workrest schedules are

as follows: development of optimum schedules, their good agreement with the biorhythmological peculiarities of every crew member, and preliminary adaptation of cosmonauts to the new cycle under favorable conditions on the earth. The optimum regimes are the routine regimes to which man normally adheres. Relatively optimum regimes are those which provide a rapid but incomplete rearrangement of the cycle. Nonoptimum regimes are those which are not followed by a synchronization of the basic functions of the human body and the altered environment. The optimum level of the diurnal cycle is dependent to a certain extent on the duration of sleep and wakefulness periods, their change and fractionation, distribution of work and rest.

Author

N74-22748 Joint Publications Research Service, Arlington, Va.
AUTOMATIC MODELING OF SATURATION AND DESATURATION PROCESSES IN THE BODY BY AN INERT GAS WITH A CHANGE IN PRESSURE

M. V. Propp *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 116-126 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 75-82

A decrease in pressure of an atmosphere containing inert gases can cause different types of decompression disorders. An examination was made of methods for the automatic modeling of the process of saturation and desaturation of the body by an inert gas with a change in pressure using analog elements in which the gas is diffused through a porous barrier. The pressure change beyond the porous barrier corresponds to the pressure change in a definite group of tissues. Use of automatic computations with analog devices makes it possible to employ the optimum pressure decrease regime, shortens decompression time, and makes it possible to avoid computations from tables. The instruments can be used in diving, caisson work, in high-altitude, and space flights.

Author

N74-22749 Joint Publications Research Service, Arlington, Va.
POSSIBILITIES OF USING A PHARMACOLOGIC AUTONOMIC BLOCKAGE (GANGLIOPLEGIA) IN AVIATION AND COSMONAUTICS

F. Smolyarek *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 127-132 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 83-85

The effect of ganglioplegia for the prevention and treatment of damage which can arise in response to extremal factors in aviation and space flights was investigated. Ganglioplegia preparations used included novocaine and its derivatives and curare.

Author

N74-22750 Joint Publications Research Service, Arlington, Va.
EFFECT OF PROTAMINE-ADENOSINETRIPHOSPHATE ON THE VIABILITY OF LETHALLY IRRADIATED RATS

T. P. Pantev, N. V. Bokova, and I. A. Nikolov *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 133-135 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 85-86

Data are presented on the synthesis of protamine-adenosinetriphosphate (PATP) and the results of an experimental study of its antiradiation properties. Experimental results show that the use of PATP as an ion residue bound with a radioprotective protein considerably reduces its toxicity, and at the same time sharply increases its protective effect.

Author

N74-22751 Joint Publications Research Service, Arlington, Va.
INVESTIGATIONS IN THE FIELD OF AVIATION MEDICINE AT THE MILITARY-MEDICAL ACADEMY IMENI S. M. KIROV (ON THE 175TH ANNIVERSARY OF THE MILITARY-MEDICAL ACADEMY IMENI S. M. KIROV)

G. I. Gurvich and Z. K. Sulimo-Samuylo *In its Space Biol. and*

Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 136-143 Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 2, Mar. - Apr. 1974 p 86-90

A historical account is given of research carried out in aviation medicine by the Military-Medical Academy imeni S. M. Kirov of the U.S.S.R. Investigations cover oxygen starvation, changes in the body under the influence of mechanical forces at the time of the change in body position, hydrostatic problems, and altitude tolerance.

E.H.W.

N74-22752*# Kanner (Leo) Associates, Redwood City, Calif.
PATHOPHYSIOLOGICAL CHANGES IN BED REST

O. J. Malm Washington NASA May 1974 10 p refs Transl. into ENGLISH from Tidsskr. Norske Laegforen. (Norway), v. 89, 1969 p 478-480 (Contract NASw-2481)

(NASA-TT-F-15639) Avail: NTIS HC \$4.00 CSCL 06P

The lack of discrimination shown by doctors in ordering bed rest for their patients is examined. Published experiences by the Romanian surgeon Liviu Campeanu and the accounts of the first surviving heart transplant patients are considered. In order to point out the very positive effects from getting a patient on his feet as quickly as possible. Among the many serious consequences of extended bed rest, the decline edemas are caused when a reduction in muscle mass is accompanied by a relative increase of free, gravitation susceptible fluid in the interstitial fluid space. The dangers to the respiratory and renal systems caused by gravitational pull on the supine system are cited.

Author

N74-22753*# Scientific Translation Service, Santa Barbara, Calif.

MENTAL STATES DURING PROLONGED HYPOKINESIA

I. A. Maslov Washington NASA May 1974 8 p refs Transl. into ENGLISH from Zh. Nevropatol. i Psikhiatr. (Moscow), v. 68, 1968 p 1031-1034

(Contract NASw-2483)

(NASA-TT-F-15585) Avail: NTIS HC \$4.00 CSCL 05J

Mental changes were studied in 6 male normal examinees in the age group from 23 to 36 years. All 6 examinees were put on a bed regimen for 62 days. In all the examinees the main form of mental change was expressed in a neurasthenic syndrome. A regular development was noted in the mental change which was conditioned by the premorbid features of the examinees. Psychological factors such as apprehension about the duration of the experiment were significant. It was concluded that change in the mental state of the examinees could be attributed to change in habitual life pattern, monotony of the environmental situation, and a certain degree of isolation.

Author

N74-22754*# Techtran Corp., Glen Burnie, Md.
ENERGY TRANSFORMATION AND PULSE RATE WITH NEGATIVE MUSCULAR WORK

E. A. Mueller Washington NASA May 1974 9 p refs Transl. into ENGLISH from Arbeitsphysiologie (Berlin), v. 15, 1953 p 196-299

(Contract NASw-2485)

(NASA-TT-F-15606) Avail: NTIS HC \$4.00 CSCL 06P

Tests employing a two-handed crank of constant revolution rate were conducted to determine performance in negative work in comparison to positive work. Three to four times higher performance was achieved in negative work.

Author

N74-22755*# Techtran Corp., Glen Burnie, Md.
HEMATOLOGICAL ADJUSTMENT TO HIGH ALTITUDES

M. G. Rinbenbach Washington NASA May 1974 19 p refs Transl. into ENGLISH from Bordeaux Med., no. 17, Nov. 1973 p 2769-2777

(Contract NASw-2485)

(NASA-TT-F-15620) Avail: NTIS HC \$4.00 CSCL 06P

Red blood corpuscle presence was studied in both venous and capillary blood in relation to high altitudes and mountain

sickness. A three-phase adaptation of these corpuscles was found to high altitudes. Hematoporphyrin is demonstrated as useful in treating mountain sickness. Author

N74-22756*# Techtran Corp., Glen Burnie, Md.
FUNCTION AND RESPIRATORY RHYTHM IN OBESE PEOPLE

F. Liot, E. Bernier, D. Lemaigre, J. F. Dessanges, and S. Poenaru Washington NASA May 1974 15 p refs Transl. into ENGLISH from Ann. Med. Interne (Paris), v. 123, no. 11, Nov. 1972 p 993-1000

(Contract NASw-2485)

(NASA-TT-F-15631) Avail: NTIS HC \$4.00 CSCL 06P

Respiratory rhythm in obese patients show that they have a low expiratory reserve. Obese patients suffering from chronic broncho-pneumopathy also have a high residual volume and a vital capacity reduction. Expiratory pauses often accompany their respiration similar to but still different from the Cheyne-Stokes syndrome. Author

N74-22757*# Techtran Corp., Glen Burnie, Md.
MEASUREMENT OF END-EXPIRATORY LUNG VOLUME (FRC) DURING EXERCISE

A. Huch Washington NASA May 1974 10 p refs Transl. into ENGLISH from Z. Prakt. Anaesthesiologie, v. 8, Jun. 1973 p 166-171

(Contract NASw-2485)

(NASA-TT-F-15640) Avail: NTIS HC \$4.00 CSCL 06P

Various parameters of respiration in dogs under anesthesia are investigated. The possible use of these techniques for measuring lung parameters in working human subjects, since methodology eliminates any subjective cooperation between researcher and subject, are also examined. Author

N74-22758*# Techtran Corp., Glen Burnie, Md.

MYOGENIC CAUSES OF HEMOLYSIS

B. Bula, E. Ziobro, and Z. Sutylo Washington NASA May 1974 10 p refs Transl. into ENGLISH from Wychowanie Fizyczne i Sport, v. 10, no. 2, 1966 p 33-38

(Contract NASw-2485)

(NASA-TT-F-15649) Avail: NTIS HC \$4.00 CSCL 06E

The numbers of erythrocytes and percentage of hemoglobin in plasma in 20 men, after subjection to cold showers and hard work, were investigated. Erythrocytes dropped in numbers and hemoglobin was found in plasma for up to an hour. Author

N74-22759*# Techtran Corp., Glen Burnie, Md.
PATHOGENESIS OF TRAUMATIC SHOCK AND CRUSHING DISEASE

S. A. Seleznev Washington NASA May 1974 56 p refs Transl. into ENGLISH from the publ. "Patologicheskaya Fiziologiya Ekstremalnykh Sostoyaniy" Moscow, Med., 1973 p 71-106

(Contract NASw-2485)

(NASA-TT-F-15316) Avail: NTIS HC \$6.00 CSCL 06P

An historical survey is presented of the pathogenesis of shock, in the course of which the various pathological aspects are examined in detail. The pathological features of crushing and therapy for the consequences of crushing are considered within the framework of the discussion of shock. Author

N74-22760*# Scientific Translation Service, Santa Barbara, Calif.

BED REST AND NITROGEN BALANCE

H. Noelle Washington NASA May 1974 18 p refs Transl. into ENGLISH from Therap. Gegenwart (Munich), v. 103, Apr. 1964 p 509-526

(Contract NASw-2483)

(NASA-TT-F-15601) Avail: NTIS HC \$4.00 CSCL 06P

Bed rest alone does not cause negative nitrogen balance. Patients requiring bed rest often have increased protein requirements because of effects of disease. Author

N74-22761*# Techtran Corp., Glen Burnie, Md.
DIAGNOSIS OF ORTHOSTATIC HYPOTONICITY

O. Thulesius and U. Ferner Washington NASA May 1974 16 p refs Transl. into ENGLISH from Z. Kreislaufforsch. (Darmstadt), v. 61, no. 8, Aug. 1972 p 742-754

(Contract NASw-2485)

(NASA-TT-F-15638) Avail: NTIS HC \$4.00 CSCL 06E

Relationships between blood pressure and heart rate, and age, weight and height are investigated. Norms are derived for the general diagnosis of circulatory disturbances. Author

N74-22762*# Kanner (Leo) Associates, Redwood City, Calif.
CHANGES IN THE CONCENTRATION OF POTASSIUM SODIUM AND CALCIUM AS THE RESULT OF ENDURANCE EFFORT

E. Preisler and R. Kadza Washington NASA Jun. 1974 16 p refs Transl. into ENGLISH from Wychowanie Fizyczne i Sport, v. 11, no. 4, 1967 p 53-61

(Contract NASw-2481)

(NASA-TT-F-15654) Avail: NTIS HC \$4.00 CSCL 06S

The potassium, sodium and calcium levels in the venous blood serum were measured in 122 persons, before and after endurance efforts of varying intensity (80 min track and field exercises, gymnastics, 1500 m swimming and bus driving). The potassium and sodium levels decreased after strenuous effort, whereas the calcium level tended to increase. Author

N74-22763# Institut Franco-Allemand de Recherches, St. Louis (France).

EFFECTS OF SONIC BANGS ON THE BEHAVIOR OF FISH (LEBISTES RETICULATUS OR GUPPY) [EFFETS DU BANG SUR LE COMPORTEMENT DES POISSONS (LEBISTES RETICULATUS OU GUPPY)]

A. Dancer, M. Schaffar, M. Hartmann, P. Cottreau (Ecole Natl. Vet., Lyon), L. Chavot (Ecole Natl. Vet., Lyon), and J. Pin (Ecole Natl. Vet., Lyon) 1973 29 p In FRENCH

(Contracts DRME/ISL-72/289;

DRME/ENVL-69/34-72800-480-7501)

(ISL-15/73) Avail: NTIS HC \$4.50

A comparison of the effect of sonic booms on two populations of fish (guppy) is presented. One of the populations was subjected to sonic booms produced by the ISL generator. The experimental set-up is described. Results show that the only observed reactions are panic reactions of short duration (0.5 sec) which appear only for intensities higher than 1 mbar. ESRO

N74-22764# Institut Franco-Allemand de Recherches, St. Louis (France).

BIBLIOGRAPHY ON SHOCK WAVE EFFECTS ON HUMAN BEINGS [ACTION DES ONDES DE CHOC SUR L'ETRE VIVANT. RECUEIL DE DONNEES BIBLIOGRAPHIQUES]

P. Rigaud and A. Dancer 5 Jul. 1973 136 p refs In FRENCH

(ISL-NB-6/73) Avail: NTIS HC \$10.00

A bibliography on shock wave effects on human beings and animals is presented. Approximately 733 references to 1970 are given. Topics include: theoretical considerations on shock waves, shock wave production, experimental techniques in various media, theory and experiments on human reactions to shock waves, specific aspects for various mammals and fishes, physiological effects on various organs, lethal limits, influence of specific physical parameters (maximum pressure, shock front, etc.), pathological anatomy, therapeutics, and protection. ESRO

N74-22765# Medical Physics Inst. Utrecht (Netherlands).

STOCHASTIC ACTIVITY IN A POPULATION OF NEURONS. A SYSTEMS ANALYSIS APPROACH

Lars H. Zetterberg (Roy. Inst. of Tech., Stockholm) Jun. 1973 32 p refs

(TNO-MFI-2.3.153/1) Avail: NTIS HC \$4.75

A functional model of a moderately large neural network has been established and is used to describe the response to certain stimulations. The model is essentially based on the work by Wilson and Cowan, but certain simplifications and generaliza-

tions have been introduced. The main interest is on the response to stochastic inputs, and it has been agreed that they may be considered Gaussian with either a flat spectrum or a colored one. In order to carry out the analysis, the nonlinear functions contained in the equations may first be linearized, while the influence from nonlinearities may be ascertained later by using a perturbation technique. ESRO

N74-22766# Naval Aerospace Medical Research Lab., Pensacola, Fla.

OPERANT BEHAVIOR OF RHESUS MONKEYS IN THE PRESENCE OF EXTREMELY LOW FREQUENCY-LOW INTENSITY MAGNETIC AND ELECTRIC FIELDS: EXPERIMENT 3 Medical Research Progress Report No. 3

John DeLorge 5 Nov. 1973 17 p refs
(MF51524015)

(AD-774106; NAMRL-1196) Avail: NTIS CSCL 06/18

The present study exposed two female rhesus monkeys to a magnetic field of 0.001 T alternating at 10 Hz and 60 Hz. Low intensity electric fields were simultaneously present. The fields did not influence operant response rates, reaction time, matching-to-sample or motor activity. This study, in addition to two similar studies with male animals, supports the contention that ELF electromagnetic fields of low intensity do not have effects on purposive behavior in rhesus monkeys. Author (GRA)

N74-22767# Childrens Hospital Medical Center, Boston, Mass. Dept. of Neurology.

DEPRESSION OF THE LECITHIN-CHOLESTEROL ACYLTRANSFERASE REACTION IN VITAMIN E DEFICIENT MONKEYS

Hubert S. Mickel, Penelope L. Hill, and K. C. Hayes 6 Feb. 1974 19 p refs

(Contract N00014-72-C-0059; NR Proj. 108-908)

(AD-773950) Avail: NTIS CSCL 06/1

Vitamin E deficiency in two species of monkeys reduced the esterification of cholesterol by the plasma lecithin-cholesterol acyltransferase reaction. The reduction was greatest in animals fed a diet rich in polyunsaturated fat and stripped of vitamin E. Concomitant to this in vitro measure was a depression in the concentration of circulating polyunsaturated fatty acid cholesterol esters. Since the plasma lecithin-cholesterol acyltransferase reaction has been shown to be dependent upon sulfhydryl groups on the enzyme, it is proposed that the observed reduction in esterification of cholesterol by plasma from vitamin E-deficient monkeys is due to alteration of these sulfhydryl sites. A similar reduction in the plasma lecithin-cholesterol acyltransferase reaction has been shown to occur during exposure in vivo to a pure oxygen atmosphere, a condition predisposing to lipid peroxidation. Author (GRA)

N74-22768# Westinghouse Electric Corp., Annapolis, Md. Ocean Research and Engineering Center.

EFFECT OF SUBSTITUTING HYDROGEN FOR HELIUM ON HUMAN THERMAL EXCHANGE IN HYPERBARIC ENVIRONMENTS Final Report, Jul. 1972 - Jan. 1974

N. Eugene Smith Jan. 1974 30 p refs

(Contract N00014-72-C-0545; NR Proj. 101-964)

(AD-774682) Avail: NTIS CSCL 06/19

The substitution of hydrogen for helium as an inert gas in hyperbaric environments was examined for its impact on human thermal exchange at depths between 10 and 100 atmospheres. Based on present data the theoretical ambient temperature required for thermal balance does not differ significantly between hydrogen-oxygen and helium-oxygen mixtures in a dry environment. A diver in cold water will experience a respiratory heat loss approximately one-third greater breathing hydrogen-oxygen, and his inspiration temperature must be adjusted accordingly. This investigation revealed a definite lack of experimental data on transport or thermophysical properties of gas mixtures involving helium and/or hydrogen at pressures to 100 atmospheres. Author (GRA)

N74-22769# Texas Univ., Austin. Electronics Research Center.

DETECTION OF REM, 1 SLEEP STAGE AND EYE MOVEMENT FROM BEAT-TO-BEAT HEART RATE

F. J. Weber, A. J. Welch, F. B. Vogt, and P. C. Richardson 6 Jun. 1973 61 p refs

(Contract F44620-71-C-0091; AF Proj. 4751)

(AD-775387; TR-150) Avail: NTIS CSCL 06/16

Interest in using sleep stage patterns to determine the amount and quality of a pilot or astronaut's sleep has led to a series of Air Force sponsored studies. The ultimate goal of these studies is to be able to determine sleep stage from beat-by-beat heart rate data alone (not using the EEG). Work performed at the University of Texas by Welch, et al, and Aldredge et al, has indicated that stage REM (rapid eye movement sleep) is refractory to detection by techniques which perform satisfactorily on the other sleep stages. In addition, the Welch algorithm performs more effectively when the times of occurrence of stage REM (or combined stages REM and 1) are already known. The purpose of this phase of study is to test the hypothesis that the occurrence of rapid eye movements can be detected by concurrent transient oscillations in the heart rate. A knowledge of REM occurrences would then greatly simplify recognition of the REM sleep stage. Alternatively, direct recognition of stage REM, 1 (stage REM and stage 1) sleep may be possible by spectral analysis of heart rate. Both possibilities are investigated. (Modified author abstract) GRA

N74-22770# Earth Satellite Corp., Washington, D.C.

AN ANALYSIS OF THE BENEFITS AND COSTS OF AN IMPROVED CROP ACREAGE FORECASTING SYSTEM UTILIZING EARTH RESOURCES SATELLITE OR AIRCRAFT INFORMATION

William Vogely 16 Nov. 1973 144 p refs

(Contract DI-14-08-001-13519)

(PB-227361/3; USGS-DO-74-002) Avail: NTIS HC\$4.75 CSCL 02D

The broad area of agricultural production was selected for the first case study based on the magnitude of potential benefits and the results of early ERTS-1 experiments. Within the area of agricultural production the case study focused on crop acreage forecasting. Compared to the USDA statistical sampling system, one based on satellite imagery would have a substantially larger number of samples, would permit substitution of cloud covered samples, and would have daily update. In the absence of estimates of overall accuracy of ERS crop acreage estimates, benefits were estimated as a function of error over a range of improvements. Inventory adjustment benefit estimates were made using a previously developed model. Estimated benefits are expected to be more equally distributed across different regions and income classes than is current income. Minimal social and environmental impacts were identified. GRA

N74-22771* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

PROGRAMMABLE PHYSIOLOGICAL INFUSION Patent

Wayne H. Howard, Donald R. Young, and Richard R. Adachi, inventors (to NASA) Issued 7 May 1974 7 p Filed 1 Dec. 1972 Supersedes N73-14092 (11 - 05, p 0503)

(NASA-Case-ARC-10447-1; US-Patent-3,809,871;

US-Patent-Appl-SN-311175; US-Patent-Class-235-151.3;

US-Patent-Class-128-214E) Avail: US Patent Office CSCL 06B

A programmable physiological infusion device and method are provided wherein a program source, such as a paper tape, is used to actuate an infusion pump in accordance with a desired program. The system is particularly applicable for dispensing calcium in a variety of waveforms.

Official Gazette of the U.S. Patent Office

N74-22772 Oklahoma State Univ., Stillwater.

THE COMPARATIVE EFFECTIVENESS OF A PROLONGED FLARE AND NORMAL FLARE ON STUDENT PILOT ACHIEVEMENT IN THE LANDING MANEUVER AND ON TIME TO SOLO Ph.D. Thesis

Wayne Robert Matson 1973 81 p
 Avail: Univ. Microfilms Order No. 74-8078

An experimental teaching strategy, employing a prolonged flare, was developed and its relative effectiveness was compared to a teaching strategy employing a normal flare. The study indicated that once a student had made his first acceptable landing, he could continue to land without assistance. Prolonged flare practice did not interfere with a student's ability to make normal flare landings. The two methods of flare were equally effective for the students learning how to land an airplane. The two methods of flare did not differentially affect student achievement in learning to solo an airplane. The study indicated that the two methods and the two environments did not interact in any significant way in any of the comparisons. Dissert. Abstr.

N74-22773* Stanford Research Inst., Menlo Park, Calif.
STUDY TO DESIGN AND DEVELOP REMOTE MANIPULATOR SYSTEM Quarterly Report, 1 May - 1 Aug. 1973
 J. W. Hill and A. J. Sword Aug. 1973 39 p refs
 (Contract NAS2-7507; SRI Proj. 2583)
 (NASA-CR-138237; QR-1) Avail: NTIS HC \$5.00 CSCL 05H

Human performance measurement techniques for remote manipulation tasks and remote sensing techniques for manipulators are described for common manipulation tasks, performance is monitored by means of an on-line computer capable of measuring the joint angles of both master and slave arms as a function of time. The computer programs allow measurements of the operator's strategy and physical quantities such as task time and power consumed. The results are printed out after a test run to compare different experimental conditions. For tracking tasks, we describe a method of displaying errors in three dimensions and measuring the end-effector position in three dimensions. Author

N74-22774* Virginia Univ., Charlottesville. Center for the Application of Science and Engineering to Public Affairs.
THE APPLICABILITY OF SPECIAL SUBJECT GROUPS FOR ASSESSING PASSENGER REACTION TO FLIGHT ENVIRONMENTS
 Ira D. Jacobson and Ashok N. Rudrapatna Nov. 1973 24 p
 (Grant NGR-47-005-181)
 (NASA-CR-132433; Rept-403211) Avail: NTIS HC \$4.25 CSCL 05E

The following conclusions were reached on passenger responses: (1) Within acceptable limits, the crew/flight attendants do not appear to be able to predict passenger responses. (2) There exists a relationship between passenger and subject overall responses. (3) Finally, a strong relationship exists between a suitably weighted running and overall subjective response. The recommended weighting function $W(I)$ is approximately equal to I to the 0.75 power, indicating that the latter part of a flight is given more importance in a subject's overall comfort evaluation than the beginning of the flight. Author

N74-22775* Kanner (Leo) Associates, Redwood City, Calif.
SUBJECTIVE AND OBJECTIVE EVALUATION OF MACHINERY NOISE
 M. Jahn Washington NASA May 1974 29 p refs Transl. into ENGLISH from *Acustica* (West Germany), v. 16, no. 3, 1965-1966 p 175-186
 (Contract NASw-2481)
 (NASA-TT-F-15593) Avail: NTIS HC \$4.50 CSCL 05E

Machinery noises were judged subjectively by 28 investigators and were combined with several methods of objective estimation. Conclusions were drawn about accuracy and reproduction of subjective aural comparisons. Testing of different calculation methods showed that for actual machinery noises, calculations of loudness from the third octave level leads to most accurate results. Author

N74-22776* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
STUDY OF EXTRATERRESTRIAL DISPOSAL OF RADIOACTIVE WASTES. PART 1: SPACE TRANSPORTATION AND

DESTINATION CONSIDERATIONS FOR EXTRATERRESTRIAL DISPOSAL OF RADIOACTIVE WASTES

R. L. Thompson, J. R. Ramler, and S. M. Stevenson Apr. 1974 64 p refs
 (NASA-TM-X-71557; E-7982) Avail: NTIS HC \$6.25 CSCL 18G

A feasibility study of extraterrestrial disposal of radioactive waste is reported. This report covers the initial work done on only one part of the NASA study, that evaluates and compares possible space destinations and space transportation systems. The currently planned space shuttle was found to be more cost effective than current expendable launch vehicles by about a factor of 2. The space shuttle requires a third stage to perform the waste disposal missions. Depending on the particular mission, this third stage could be either a reusable space tug or an expendable stage such as a Centaur. Author

N74-22777* Techtran Corp., Glen Burnie, Md.
WHO SHOULD BE ENTRUSTED WITH AN INTERPLANETARY SPACECRAFT?
 O. Borisov Washington NASA May 1974 8 p Transl. into ENGLISH from *Kazakhstanskaya Pravda Newspaper*, 3 Apr. 1974 p 4 and *Medistinskaya Gazeta*, 12 Apr. 1974 p 4
 (Contract NASw-2485)
 (NASA-TT-F-15644) Avail: NTIS HC \$4.00 CSCL 05E

Psychological compatibility in an international crew is discussed. Although disagreements and clique formations are inevitable, they can be minimized by a scientific approach to group selection and, especially, selection of a commander. Selection should be based not only on professional qualifications, but also on the individual's ability to relate to others, and training should develop this ability. Previous experience in stress situations is very helpful. Good group relations are also aided by an awareness of differences within the group and by the process of overcoming physical hardships together. Author

N74-22778* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SUMMER INSTITUTE IN BIOMEDICAL ENGINEERING, 1973 Final Report
 Eugene M. DeLoatch Feb. 1974 117 p refs Prepared by Howard Univ.
 (Grant NGT-09-011-051)
 (NASA-TM-X-70639; X-207-74-103) Avail: NTIS HC \$9.00 CSCL 06B

Design and development work is reported for an air filter, an infant weight scale, multiple electrode cardiography, a white noise hearing aid, and a tibial torsion correction device. For individual titles, see N74-22779 through N74-22784.

N74-22779* Massachusetts Inst. of Tech., Cambridge.
SURGICAL SUITE ENVIRONMENTAL CONTROL SYSTEM
 Eve J. Higginbotham and Marc L. Jacobs (Lehigh Univ., Allentown, Pa.) In NASA. Goddard Space Flight Center Summer Inst. in Biomed. Eng., 1973 Feb. 1974 24 p refs

CSCL 06B

Theoretical and experimental work for a systems analysis approach to the problem of surgical suit exhaust systems centered on evaluation of halothane absorbing filters. An activated charcoal-alumina-charcoal combination proved to be the best filter for eliminating halothane through multilayer absorption of gas molecules. G.G.

N74-22780* Wichita State Univ., Kans.
SURFACE POTENTIAL PROFILES
 John K. Sharp and William P. Jones, Jr. (Purdue Univ.) In NASA. Goddard Space Flight Center Summer Inst. in Biomed. Eng., 1973 Feb. 1974 15 p

CSCL 06B

The gathering of surface potential profiles by computerized processing of electrocardiogram data is projected. These profiles

are concerned with the detail of localized potentials on the human body and are obtained by voltages plotted against electrode positions with time as the variable held constant. Sample and hold circuits are considered for processing the multiplexed signal and to digitize and code it for the tape recorder. G.G.

N74-22781* Cornell Univ., Ithaca, N.Y.

THE DESIGN OF A DEVICE FOR HEARER AND FEELER DIFFERENTIATION, PART A

Rodney Creecy /In NASA. Goddard Space Flight Center Summer Inst. in Biomed. Eng., 1973 Feb. 1974 12 p refs

CSCL 06B

A speech modulated white noise device is reported that gives the rhythmic characteristics of a speech signal for intelligible reception by deaf persons. The signal is composed of random amplitudes and frequencies as modulated by the speech envelope characteristics of rhythm and stress. Time intensity parameters of speech are conveyed through the vibro-tactile sensation stimuli. G.G.

N74-22782* Gallaudet Coll., Washington, D.C.

THE DESIGN OF AN EXPERIMENT FOR EMPLOYING THE HEARER-FEELER DIFFERENTIATION DEVICE, PART B

Ronald W. Betchtel /In NASA. Goddard Space Flight Center Summer Inst. in Biomed. Eng., 1973 Feb. 1974 6 p refs

CSCL 06B

An experimental test design is outlined to separate feelers from hearers in the evaluation of persons with varying degrees of hearing impairments. Speech envelope cues are derived from a white noise device containing filters for different frequencies that produce speech awareness thresholds. G.G.

N74-22783* Rose-Hulman Inst., Terra Haute, Ind.

DESIGN OF AN AUTOMATIC WEIGHT SCALE FOR AN ISOLETTE

Robert J. Peterka and William Griffin (National Technical Inst. for the Deaf) /In NASA. Goddard Space Flight Center Summer Inst. in Biomed. Eng., 1973 Feb. 1974 15 p refs

CSCL 06B

The design of an infant weight scale is reported that fits into an isolette without disturbing its controlled atmosphere. The scale platform uses strain gages to measure electronically deflections of cantilever beams positioned at its four corners. The weight of the infant is proportional to the sum of the output voltages produced by the gauges on each beam of the scale. G.G.

N74-22784* Pan American Univ., Edinburg, Tex.

INTERNAL TIBIAL TORSION CORRECTION STUDY

Juan M. Cantu and Coleen M. Madigan (Houston Univ.) /In NASA. Goddard Space Flight Center Summer Inst. in Biomed. Eng., 1973 Feb. 1974 23 p refs

CSCL 06B

A quantitative study of internal torsion in the entire tibial bone was performed by using strain gauges to measure the amount of deformation occurring at different locations. Comparison of strain measurements with physical dimensions of the bone produced the modulus of rigidity and its behavior under increased torque. Computerized analysis of the stress distribution shows that more strain occurs near the torqued ends of the bones where also most of the twisting and fracturing takes place. G.G.

N74-22785* Scientific Translation Service, Santa Barbara, Calif.

THE EFFICIENCY OF LOCOMOTION

Erich Albert Mueller Washington NASA May 1974 14 p refs Transl. into ENGLISH from Arbeitsphysiologie (Berlin), v. 14, 1950 p 236-242

(Contract NASw-2483)

(NASA-TT-F-15600) Avail: NTIS HC \$4.00 CSCL 05E

Efficiency in walking was measured by using a tow rope, or a descending slope, to balance energy requirement until the minimum energy was attained at 4 kg pulling force. Walking work was 0.065 mkg per meter of distance and per kilogram of body weight. The efficiency was 26-27%. Maximum efficiency was reached at 2 - 3 kg opposing force, where efficiency was 31%. Author

N74-22786# Joint Publications Research Service, Arlington, Va.

COSMONAUT FLIGHT PREPARATION

A. Nikolayev 24 May 1974 18 p Transl. into ENGLISH from Krylya Rodiny (Moscow), no. 2, Feb. 1974 p 10-14 and no. 3, Mar. 1974 p 10-13

(JPRS-62083) Avail: NTIS HC \$4.00

Answers are given to questions concerning the training of cosmonauts for flights, content of the principle aspects of the program for their general, technical, special, and physical training, and about the design and layout of the Soyuz spacecraft. Author

N74-22787* Techtran Corp., Glen Burnie, Md.

THE PARTIAL SIMULATION OF WEIGHTLESSNESS IN WATER

H. Vondiringshofer Washington NASA May 1974 9 p refs Transl. into ENGLISH from Zentral. Verkehrs-Med., Verkehrs-Psychol. Luft- und Raumfahrt-Med. (West Germany), v. 10, no. 4, Dec. 1964 p 193-197

(Contract NASw-2485)

(NASA-TT-F-15650) Avail: NTIS HC \$4.00 CSCL 05E

Some balneology findings are shown to be of interest in space research. Various applications for the study of weightlessness are given. Author

N74-22788* California Univ., La Jolla. Dept. of Radiology. **DEVELOPMENT AND INVESTIGATION OF SINGLE-SCAN TV RADIOGRAPHY FOR THE ACQUISITION OF DYNAMIC PHYSIOLOGIC DATA** Semiannual Report, 1 Nov. 1973 - 30 Apr. 1974

Norman A. Baily 30 Apr. 1974 57 p refs

(Grant NGR-05-009-257)

(NASA-CR-138450) Avail: NTIS HC \$6.00 CSCL 06R

Research data obtained by the low dose electronic radiography system are reported. Data cover: (1) localization and tracking of Ta screws implanted in the inner wall of the right ventricle of the heart, (2) use of cross hairs to outline inner or outer heart wall contours, (3) quantitative measure of anatomical components which are stationary in size or change size dynamically, and (4) study of dynamic quantitative data from roentgenologic or fluoroscopic procedures. E.H.W.

N74-22789# Medical Physics Inst. Utrecht (Netherlands).

[ACTIVITIES OF RESEARCH GROUPS] Progress Report

Aug. 1972 194 p refs

(TNO-MFI-PR-3) Avail: NTIS HC \$12.75

The activities of the Medical Physical Institute TNO during 1971-1972 are reported. They include the following areas: aids and appliances for the bodily handicapped, cardiovascular physics, brain research, ultrasound diagnostics, cybernetics, physiological signal processing, and promoting applications. ESRO

N74-22790# Human Resources Research Organization, Alexandria, Va.

UH-1 HELICOPTER MECHANIC (MOS 67N20) JOB DESCRIPTION SURVEY BACKGROUND, TRAINING, AND GENERAL MAINTENANCE ACTIVITIES

Russel E. Schulz, Barbara K. Fitzgerald, and Wallace W. Prophet Dec. 1973 203 p refs

(Contract DAHC19-73-C-0004; DA Proj. 2Q0-62107-A-745) (AD-775390; HumRRO-TR-73-33) Avail: NTIS CSCL 05/9

The report describes the planning, conduct, analysis, and results of a worldwide survey of the maintenance activities of over 5,000 UH-1 helicopter mechanics, MOS 67N20. It describes

methods and techniques used in developing the survey questionnaire and a job description inventory covering more than 1,400 helicopter maintenance tasks, administration of the survey by mail and by research teams in the field, and extraction and analysis of survey results. The report provides a broad profile of UH-1 maintenance personnel, their training and background, and a description of the UH-1 mechanic's general job activities. Data concerning performance of the 1,400+ maintenance tasks are presented in a companion report. Author (GRA)

N74-22791# Environmental Protection Agency, Washington, D.C. Environmental Research Center.

ALTERNATIVE FUTURES AND ENVIRONMENTAL QUALITY

Peter Barth, Murray Bowen, John Calhoun, Alexander Christakis, and Chester Cooper Nov. 1973 248 p refs (PB-226052/9) Avail: NTIS HC \$3.85 CSCL 13B

This book is divided into two parts. Part one, Challenges of Alternative Futures, reviews the environmental and population issues, presents a recent systems method of analyzing the problems of growth and summarizes the international implications of growth policy. Part two, Coping with Alternative Futures, presents human behavioral factors and their influence on growth policy. Classical and modern concepts of economics and implications of economics for growth policy conclude the work.

Author (GRA)

N74-22792# Iowa Univ., Iowa City.

EFFECT OF TRAINING AND HEAT-ACCLIMATIZATION ON THE MECHANISMS OF TEMPERATURE REGULATION IN MAN Technical Report, 1 Jun. 1972 - 31 May 1973

Carl V. Gisolfi 25 May 1973 83 p refs (Contract N00014-68-A-0196-0008; NR Proj. 101-812) (AD-773962) Avail: NTIS CSCL 06/19

The objectives of the task order were to determine the effects of physical training in a cool environment on the tolerance of men for work in the heat, the effects of short-term heat-acclimation on the ability of men to perform prolonged work in the heat, and the effects of training and heat-acclimation on the sensitivity, rate, and distribution of sweat on the body surface and the distribution of blood in the lower limbs during leg exercise. Also included in this report is a comparison of mean skin temperature weighting formulas during different combinations of work loads and ambient conditions as well as an evaluation of hyperthermic preventive techniques during prolonged severe exercise in the heat (33/21 C db/wb). (Modified author abstract) GRA

N74-23266* Kanner (Leo) Associates, Redwood City, Calif.

NEW EXPERIMENTAL CONTRIBUTIONS TO UNDERSTANDING THE EFFECT OF ULTRASONIC IRRADIATION ON TOMATOES

A. Elena In its The 4th Natl. Conf. on Acoustics, Vol. 2, B (NASA-TT-F-15663) Apr. 1974 p 238-242 refs Transl. into ENGLISH from A 4-A Conferinta Natl. de Acustica. Vol. 2, B: Ultrasonete (Bucharest), 29-31 May 1973 p 311-316

Irradiation of Aurora 100 tomatoes by a hydrodynamic ultrasonic generator with a frequency of 25 kHz per sec intensifies seed germination and the growth of the plants, causing precocity and increasing the output by 15.63 to 37.65%. The most effective radiation time (between 20 and 40 min) intensifies the phenophases. It causes some increase in output and changes in the chemical compositions of the fruits. Author

N74-23267* Kanner (Leo) Associates, Redwood City, Calif.

THE ACTION OF ULTRASOUNDS ON BEZOSTAIA 1 WINTER WHEAT GROWN IN SAND POTS TREATED WITH KNOP SOLUTION

N. Albu In its the 4th Natl. Conf. on Acoustics, Vol. 2, B (NASA-TT-F-15663) Apr. 1974 p 244-249 refs Transl. into ENGLISH from A 4-A Conferinta Natl. de Acustica. Vol. 2, B: Ultrasonete (Bucharest), 29-31 May 1973 p 319-324

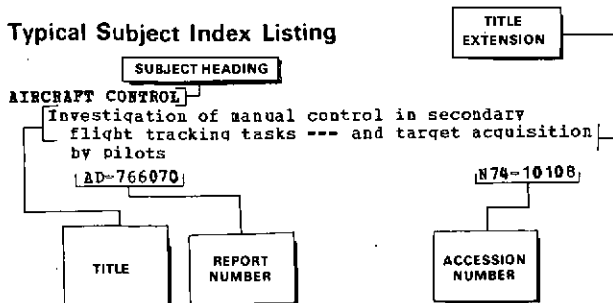
CSCL 06H

The results of 3 years of research are presented concerning the increase in length and weight of the aerial biomass as compared with the underground biomass, as well as the productivity indexes of Bezostaia 1 winter wheat. The experiment involved two varieties, each of them with nine repetitions. Sterile sifted sand treated several times with a Knop solution during the vegetative period was used as a seed bed. The seeds were kept in water for 2 hours before treatment. Biometric and statistical measurements showed significant responses in the treated varieties. Author

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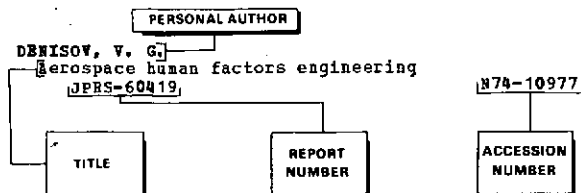
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